Report

on

DEVELOPMENT NORMS PROJECT ON CHILDREN

of

5½ Years to 11 Years

(Varanasi Centre)

Sponsored and Financed by the

National Council of Educational Research and Training, New Delhi

Dr. Bishwa B. Chatterjee
Honorary Project Director

Shri Sheo Swarath Singh
Associate

Shri Ram Pratap Singh
Associate

Department of Psychology and Education
GANDHIAN INSTITUTE OF STUDIES
Rajghat, Varanasi-221001

December, 1974

FOREWORD

The Gandhian Institute of Studies has, in collaboration with the NCERT, completed an evaluation project of educational system of the country. It was a nationwide project conducted in seven centres. The focus of the study was however on school-going children of the age of 5½ years to 11 years. The purpose was to find if a certain set of recognised antecedents have any correlation with the educational abilities and achievement of the children. The study has been completed in a record period of time under the able guidance of Dr. B.B.Chatterjee, the Professor of Psychology of the Institute.

The findings of the study are in a way not at all spectacular, they seem to confirm the obvious. Urban boys have, for example, been found to be brighter than those who come from the rural area. As one travels upward in the pyramidal structure of higher education, the urban boy fairs still better and his rural counterpart lags behind, further and further. The students who go to a school which have better facilities than the others do better than those who attend the latter. Students, whose parents are educated, similarly fair better in comparison to those whose parents are not so lucky. An educated mother, it seems, almost always exercises, likewise, a healthier influence on the child, as far as his formal education is concerned.

The findings of the study, as I have said before, are in a way very routine and common place. They measure the "achievement" capacities in the traditional areas of class room teaching. Viewed from a more fundamental insight however, the data provided by this study may reveal more than what meets the naked eye. Two things are clear. It is the home, it is the neighbourhood, it is the family that thus lend all the legitimacy to the traditional school. It is the urban society which after a school is uprooted from the rural society helps it to grow its educational curriculum through a process of constant urbanization. The children who come from the villages thus fail to compete in the urban schools. The total social milieu raises an inescapable fence around the new school, which is a product of the total urban society, and those who are a product of the latter naturally do better than others.

The findings of the study seen from this point of

view cannot but be of crucial importance, at a time when the educationists of the country are pleading for an altogether new educational system and seeking to establish fresh norms of achievements. For if the new school is no longer to be an alienated institution, if the new educational system is to offer worthwhile opportunities to people of the rural areas as well, changes will have to be made, not only in the curriculum of studies, but also in the society at large. The family that protects the existing school, the urban society that gives it legitimacy, educated parents who help the school to survive, all of them will have to be reoriented. A new educational system will therefore require a new society to help it grow. We have so long been toying with a hackneyed proposition that a new school will automatically create a new society. The reverse on the other hand seems to be true. A new society is thus the condition precedent for a new school and probably not vice versa.

Gandhian Institute of Studies
Varanasi

Sugata Dasgupta

INTRODUCTION

The Gandhian Institute of Studies received an invitation from the NCERT to collaborate in this seven-centre study of the developmental norms of school going children between the age groups 5½ years to 11 years around April 1970. By about July 1, 1970, the Varanasi Centre at the Gandhian Institute started work on this project. It has taken a little more than 4½ years for the project to be completed and the report, in its final version to be compiled.

This report is based upon test data collected from 31 schools spread all over the Varanasi district, 16 of them in the rural areas, and 15 within the confines of the corporation limits of the city of Varanasi. The total sample consists of 603 children drawn from Grade I, II and V, of those 31 schools. Besides the performance of these students in two school subjects, viz. Hindi and mathematics, data about their performance on a number of psychological tests, and their family background factors have been systematically collected under uniform conditions, and have been analysed by appropriate statistical techniques. The results of these analyses are now being presented before the reader.

Even though the size of the sample was not large, but the mass of data collected was quite voluminous. Altogether there were 41 separate variables conceptualized, and analysis with regard to trends of their distributions, varying from one group to another, the nature of inter-relations and inter-dependencies between them have been studied in considerable detail. Some exercise has been included to show how knowledge of performance in standard and selected psychological tests can be used for predicting success in school subjects like Hindi and Mathematics.

Assistance from computer has been freely utilized for getting the statistical analysis of the mass of data done expeditiously. One result of using the computer is over-computation; the computer tends to give more output than one can reasonably afford to include within one report of not too bulky a size. This happened with the present study also. A selection from the huge mass of computerized results from the data analysis has been presented in this Report. It is hoped, given time and opportunity, some additional papers

would be published by making use of some of those statistical results not included in the present study.

The major attempt has been to present the picture as objectively as possible- how groups of children, drawn from 3 grades of 31 schools spread all over Varanasi have performed in a series of tests - some measuring psychological functions, and some aptitude and ability in school subjects. There are many educational implications of such findings: some have been pointed out. Some, the patient reader may find himself.

The reader will find that in certain chapters, specially chapters 11 through 16, considerable details, and in certain cases, even actual distributions of scores made by different groups of children, have been reproduced. This has been done with a purpose. The way this study has been conducted, with meticulous attention to sampling, standardized instruments, and uniformity of testing conditions, qualifies it to serve as a bench-mark survey as well. Should there be an occasion for a replication of this study after a certain period of time has elapsed, the findings of this Report would then lend themselves for ready comparison with new observations.

This Report is quite bulky. This has been caused due to its attempt at comprehensiveness. Even then the senior author of the Report has a feeling that a few more interesting implications could have been pulled out from the mass of computations that have been carried out, but had to be excluded from the Report, to keep its size from becoming prohibitively bulky.

This Report samples the educational situation at the primary level as it obtains in the Varanasi district. There will be six more reports paralleling this one- dealing with six other areas spread all over the country, spanning Ranchi to Trivandrum, and Delhi to Bangalore. It will be now for the readers to judge how far this Report, along with its companion volumes from six other centres have served the cause of educational research in our country.

B.B. Chatterjee
B.B. Chatterjee
Honorary Project Director

Dec.23, 1974

ACKNOWLEDGEMENTS NCERT

In order to complete this investigation, and then write a fairly bulky report upon it, help had to be sought, and obtained, from a large number of persons, all of whom perhaps cannot be named individually, but they have earned gratitude of the research team. However, this opportunity may be utilised to thank at least a few of them more specifically for the valuable contribution they made towards the successful completion of this 4½-year project.

The headmasters and teachers of the thirty-one primary schools that constituted the main school sample of this study, and a few more schools which comprised the pilot sample, have earned our gratitude for the help and cooperation they extended to us in carrying out our study. The various officials of the education department, the inspectorate of schools, and the inspectorate of girls schools were always helpful, and accorded to us their valuable cooperation at every stage of the study. We also cannot forget the sincere hospitality and welcome we received in all schools specially from those in the remote areas of the district.

The research team has been very greatly benefited from the periodic meetings, the first of which was held at Bangalore, and the remaining at Delhi. Honorary Project Directors and staff of the remaining centres had all along been very cooperative and ever ready to help in a variety of ways. The constant communication that took place between the seven centres has been a special feature of this research project.

The staff of the Delhi Centre, belonging to NCERT itself, which happens to be the sponsoring and financing agent for this ambitious seven-centre research project, had to put up with a variety of demands from us, throughout the long project period. We recall with gratitude and pleasure, the unfailing cheerfulness, courtesy, and helpfulness that characterised the response from one and all of the NCERT, whenever approached for some assistance or fulfilling some special need. Dr.(Mrs.) Perin Mehta, Miss Indira Malani, Dr.(Mrs.) Murlidharan, Mrs. Snehlata Shukla, Dr. A.B.L.Srivastava, Dr. R.R.Mathur, Mr. Gajwani, Mr. Mohanlal and Mrs. Bevli and many others will always be remembered for the warmth and friendliness they brought to bear even upon their routine functions related to this research project. We will fail in our duty if we do not record our deep appreciation of the patient and kindly way with which Miss Malani made us feel that she was always there ready

to share the trials and tribulations that invariably accompanied the carrying out of this research project from the Varanasi Centre.

The authorities of the NCERT have earned our gratitude for reposing their trust by farming out this study, among others, to the Gandhian Institute of Studies.

Our debt of gratitude to Shri R.C.Chanda, Joint Director, Computer Center, PEO, Planning Commission, New Delhi, and his able staff, is very great. Without the magnificient help rendered by Shri Chanda and his staff, this report could never have been printed in time.

A word of thanks is specially due to M/s. Harsh Printers of Varanasi: they patiently carried out whatever printing assignments were given to them, always within the shortest possible time allowed to them.

To thank various persons in the Gandhian Institute, including its administrative staff, will be out of place, because that amounts to thanking one's own self. However, let us at least mention the ungrudging cooperation given to us by Shri Ram Awadh and Shri Manik Chand, drivers of the Institute vehicles, who were ever eager to make the task of the project team easier.

A research project which spanned a period of 4 years and 8 months, from the day the proposal was first mooted, to the day the final report was ready, must have benefited from a variety of considerations, adjustments, accommodations and assistance from many quarters which will necessarily remain unnamed. But it is the pleasant duty of us to record our debt of gratitude to all who tried to help. Last, but not the least, thanks are due to Miss Saroj Mehrotra, Mr. Om Prakash Srivastava, and Mr. K.M.Gupta, who ably served on the research project for varying periods of time.

Varanasi
24-12-1974

B.B.Chatterjee
Sheo Swarath Singh
Ram Pratap Singh

D E D I C A T I O N

The investigation upon which this Report is based enabled the research team to gain valuable first-hand knowledge about the working of many primary schools spread all over the district of Varanasi. The headmasters and teachers of these primary schools, vested with the responsibility of laying the educational foundation of the State, are doing an excellent job, in the face of many hurdles and hardships. The Report is dedicated to these headmasters and teachers of the primary schools of the Varanasi District.

Contents

Chapter I

Introduction - Mainly Historical

Genesis of the Project

The NCERT, several years ago, had undertaken a large-scale research project in developmental psycholog which was entitled "Developmental Norms Project for Children of 2½ to 5 years of Age." In order to have a wide coverage of the country, the NCERT decided to carry out this project with the collaboration of several departments of psychology and education, spread all over the country. In the light of experience gathered from carrying out of this fairly big study, covering a number of regions in the country, each regional center being looked after by one department of psychology or education of a university, the NCERT decided to extend this experiment of a collaborative study in which the subject of the study would now be children of 5½ to 11 years. As before, the study would be conducted by a number of centres spread throughout the country. The Department of Educational Psychology and Foundations of Education of the NCERT would be the co-ordinating centre. Of course, the NCERT would finance the entire project.

NCERT, accordingly, started negotiations with several prospective Departments of Psychology and of Education, of certain universities and research institutions, who might agree to start a centre each for carrying out the study in the region around each centre.

In this connection, the first exploratory letter was written to the Gandhian Institute on April 7, 1970. In this first letter on this subject, certain basic points were spelled out, which turned out to provide the future structure of the entire study, and are therefore, worth reproducing here:

1. This study would be somewhat in the nature of continuation of, as well as extension of, the earlier study on the developmental norms of children of the age group 2½ years to 5 years.

2. In this new project, the target sample will be school going children belonging to the age group 5½ to 11 years.

3. In this new project, the major orientation will be towards elucidating the nature and extent of relationship between a number of independent variables pertaining to the school and home, and the dependent variables of school achievement and cognitive development of the child. The major interest being in the 'consequent variable of school achievement',

it was hoped that the findings of the study would help to 'improve education in the school'.

4. It was hoped that the pooled findings from the different collaborating centres will lend themselves to the development of 'norms' for this age group of children. Of course, they would perhaps be more like regional norms, rather than national norms.

5. Certain amount of flexibility was to be made built-in feature of the studies to be conducted by the different centres, at the same time maintaining a communality and continuity of theme and research design for each of the separate studies to be carried out by each of the collaborating centres. This was to be insured in the following manner:

(a) There will be a core set of variables- independent and dependent- that will be common to all centres collaborating to carry out the study.

(b) In addition to those core set of variables, each centre will be free to include some more variables- both independent and dependent- to be studied.

It is naturally expected that the choice of these additional variables will be reflective of the research interest of particular centres- one centre may like to explore more thoroughly home and parental variables and their impact upon children's development and achievement. Another centre may like to concentrate on the intricacies of the processes that are related to the cognitive functioning of growing children. Two or more centres may like to share certain variables among them, which other centres may not study at all.

6. To ensure still greater continuity, comparability, and comprehensiveness of the study, it was understood, that the Delhi Centre, that is the Centre of the Department of Educational Psychology and Foundations of Education, will try to include all or almost all of the variables chosen by the remaining Centres, in addition to one or more that this centre itself might choose on its own, which, in turn might or might not be chosen by any other collaborating centre(s).

7. In line with ensuring a common framework for studies to be conducted by different centres, tools developed by one centre could be used by other centres, if feasible.

8. Likewise, the different collaborating centres would be communicating with each other, and share experience of one another, and help each other, to economise on effort and resources, and also maximize comparability of the studies across the centres.

9. The Delhi centre would also assume the important role of coordination among various centres.

10. Holding of periodic meetings of the Honorary Project Directors and Project staff was envisaged. In these meetings progress at various centres would be discussed, new time schedules laid down, and all technical aspects of the carrying out of the projects by the various collaborating centres would be discussed in great detail and decisions would be made on questions of importance.

The response on the part of the Department of Psychology and Education to this offer to collaborate in this nationwide project, sponsored and financed by such a prestigious, national-level organization as the NCERT was immediate and enthusiastic. The author of this report wrote, in a letter dated April 23, 1970:

> "In my personal and professional view this is a very welcome proposal indeed, for a number of reasons. The subject matter is of great importance. In western countries, such norms have been painstakingly established, after years of elaborate research. We have nothing like Doll's Vineland Maturity Scale, or Arnold Gessell's Developmental Norms for our own country. For a particular age, what should we expect our children to normally achieve, in terms of physical, mental and moral development, will ever remain a matter of fancy and personal predilection until we establish these norms on the basis of scientific studies. This is what this project has as its major goal."

A draft proposal, in barest outline, was prepared and submitted to the NCERT. A more elaborate outline was next prepared and submitted. In these earlier proposals, as well as later modifications thereof, the underlying idea remained constant: this study on the norms of the developmental process undergone by the typical Indian school-going child, despite its focus on the relationship between school and home environmental factors on the one hand, and level of achievement attained on the other provides a splendid opportunity also for studying the child personality as a whole to a considerable extent. And, therefore, the Varanasi centre would like to frame a research design which will entail studying a large number of variables which were known to be related to various aspects of the total personality of child-cognitive, affective and conative. Of course, the overall scope of the study will set limits to the number of variables to be included for studying: an active attempt to optimize on the selection of variables covering all the three areas of development of the child personality-cognitive, affective and

conative, characterised the design that was originally framed, and modifications and revisions that were made, from time to time, consequent upon discussions held with members of other collaborating centres, and also in the light of experience gathered from preliminary try-outs and pilot studies.

The first meeting of the Honorary Directors of the collaborating centres, took place in late June, 1970, at Bangalore. In this meeting, a few members of the project teams which had already started functioning, such as Delhi and Bangalore centres, also participated. By that time, the situation with regard to which centres would collaborate in this project had sufficiently crystallized. It turned out that there would be 7 collaborating centres altogether, including the Delhi Centre, which, besides functioning as a regular centre, would also carry out the no less important task of coordination among all the collaborating centres.

The meeting that was held at Bangalore on June 25-26, 1970 can be considered to be crucial, in that it laid down fairly detailed and durable framework for the overall plan of attack on the present study, and also laid down ground rules for executing the plans formulated by the different centres.

Some detail about this rather crucial meeting has been summarized and presented in Table 1-1.

Important decisions of the Bangalore Meeting

As pointed out earlier, certain decisions were made at the Bangalore meeting, a clear understanding of which will facilitate in understanding the over-riding orientation of the entire seven-centre study, along with its scope and coverage. These are briefly summarized below.

(a) The first decision was concerned with the fundamental nature and scope of the study.

As early as 1-5-1970, in a letter addressed to the author of this report, Miss Indira Malani, Co-ordinator for this project from the Delhi centre had made certain clarifications with regard to the basic nature of this project, and its overall scope thus:

> "This project is clear departure from the procedure followed and design of the Developmental Norms Project for the 2½ to 5 years old children. It is not necessary to ensure continuity with DNP 2½ to 5,.....(where) developing norms was the major objective. This study has been named DNP 5½ - 11 for administrative reasons. Working out of norms will be incidental, since data will be available for a fairly large sample".

Table 1-1

Details about participation at the First Honorary Directors' meeting held at Bangalore on June 25-26, 1970

Collaborating Centre	Hony.Project Director	Special Focus/Feature	Coverage
1. Department of Educational Psychology and Foundation of Education, NCERT, Delhi	Dr(Mrs)Perin Mehta	Core Study- including most variables of other centres	State of Delhi
2. Department of Applied Psychology, Bombay University, Bombay	Prof. S.V. Kale	Piagot-type tasks	Bombay City
3. Department of Psychology University of Kerala, Trivandrum	Prof. E.I. George	Children's Play	
4. Department of Post-Graduate Studies in Education, Bangalore University, Bangalore	Prof. N.V. Thirtha	Scales for measuring functioning of schools and Social Maturity	
5. Department of Psychology, Osmania University, Hyderabad	Prof. E.G. Parameshwaran	Parental Variables and moral development of children	Certain districts around Hyderabad
6. Department of Psychology, Ranchi University Ranchi	Prof. A.K. Singh	Differential performance of tribal and nontribal children and their moral development	Certain districts around Ranchi
7. Department of Psychology and Education, Gandhian Institute of Studies, Varanasi	Prof. B.B. Chatterjee	'Popularity' and performance on Mosaic test by children	District of Varanasi

This point was gone into in considerable detail, and it was agreed that development of norms, as in the accepted sense of the term, would only be incidental, by virtue of the flexibility of research designs framed, varying from one centre to another, ensuring only a minimum core, common to all centres, that is, to be investigated by all centres. Even here, it was pointed out that wide regional variability within a large and cultural heterogenous country like ours, would permit pooling of data common to all centres, for developing something resembling actional norms, only if certain conditions and qualifications are fulfilled. Since norms were to be of achievement in school subjects, like language and mathematics, inter-state variability of curricular standards would also put severe limitation on developing any scale or measuring standard that could be used across different states.

(b) Elaborating further, Miss Malani had underlined the major trust of the overall study thus:

> "In this study we are primarily interested in investigating the relationship between environmental process variables in home and school, and school achievement, cognitive and social development of children".

The elements crucial to the study are two broad categories of variables: (i) environmental process variables in home and school, and (ii) development of the child, as reflected in his achievement, in school subjects, his level of cognitive functionings, and the quality of his social inter-actions. The Honorary Directors of the various centres agreed that this purpose could/be achieved by permitting each centre to include one or more variables, belonging to either one or the other, or both the broad categories spelled out above, viz. "environmental process variables" and "developmental variables_cognitive, social and school achievement", depending upon the special inclination and interest of each of the seven collaborating centres. Further, certain variables could be shared by two or more centres in common. This principle of controlled flexibility among various collaborating centres in the matter of framing their unique designs thus became a most important feature of this "INP 5½ to 11 years project". This variability around a common core has again been put very neatly by Miss Malani in her letter of 2-5-70, "different centres have been encouraged to develop their own designs in such a way that certain aspects of these studies are dovetailed into one another as well as ensuring an overlap with the core study at Delhi".

(c) The third major decision was concerned with the principles of sampling frame to be observed by the different centres. The statistical consultant of the NCERT who was a participant in the deliberations spelled out in detail how the proportionate random stratified sampling could be used for selecting schools varying along certain dimensions, and then children in

the different grades belonging to the age range of $5\frac{1}{2}$ to 11 years. Two important decisions made were; (i) The total sample of children to be studied in each centre should be 600; it might be somewhat more, but not less than 600. (ii) The children would be chosen from three grades, I, II and V; and within grade I only those children would qualify whose age falls within the range $5\frac{1}{2}$ to $6\frac{1}{2}$ years; within Grade II, only those children would qualify whose age falls within the range $6\frac{1}{2}$ to $7\frac{1}{2}$ years; and within Grade. V, only those children would qualify whose age falls within the range $9\frac{1}{2}$ to 11 years. Thus, the sample of children will belong to three strata of combined age-grades, Grade I - age $5\frac{1}{2}$-$6\frac{1}{2}$ years, Grade II- age $6\frac{1}{2}$ to $7\frac{1}{2}$ years; and Grade V- age $9\frac{1}{2}$ to 11 years.

This meant that this study would not include children of Grade III, and Grade IV; nor children who belonged to the age range $7\frac{1}{2}$ to $9\frac{1}{2}$ years and within any of the three grades I, II or V, children not falling within the corresponding age ranges would also be automatically excluded from the sample.

(d) For obtaining the best results from such a massive research spread over 7 regions of the country certain administrative procedures were recommended. One was that periodic meetings of the Honorary Directors would be held, which would be co-ordinated by the Delhi Centre. In these meetings progress made by different centres would be considered, schedule of work would be revised, and other decisions arrived at, affecting the working of the project at various centres. The second was about fixing up of a time-table for the phasing of the project. It was decided that the project would be completed by the end of March 31,1974. These would be tryouts of the instruments, following which there would be a proper pilot study. Comparing of notes of the findings of the pilot studies conducted by the various centres would then follow, by which final decisions would emerge regarding design, procedure and instruments to be used in the final or study proper. Thus the pilot study would occupy a key position with regard to the final shape that the study would assume at different centres.

(e) Consultation and communication among the different collaborating centres were actively sought to be encouraged from the beginning. It was implicitly accepted that each centre would be ready to help any other centre by sharing its experience, results of preliminary try-outs or pilot findings, and by lending test material developed by it. Any special help that can be rendered by one centre to another was to be freely given.

(f) Expert advice of Statisticians of the Delhi centre was understood to be made available to such centres which would solicit such help. Of course, they would also be available for general consultation during the annual meetings of the Honorary Directors.

The ground rules that were evolved in this crucial Bangalore Meeting gave such a durable structure and direction to this study, that the carrying out of the investigation by the seven centres, inspite of many unforeseen hurdles and handicaps, proceeded with remarkable smoothness and adherence to the time schedule. There was considerable cooperation, consultation and communication among the seven different collaborating centres. Again, in line with the decisions of the Bangalore meeting, two annual general meetings of the Honorary Project Directors were held at Delhi. One was held in Aggust 1971, and the other in August 1972. Very crucial decisions with regard to all the aspects of the studies conducted by the seven centres were taken in those two meetings. Re-phasing of the time-schedule of projects at the different centres was an important aspect of each of those two general meetings held at Delhi.

It found rather difficult to assemble all the Honorary Project Directors a fourth time. Therefore, the Varanasi Centre project staff, along with the present writer of this Report took the initiative to hold a meeting with the project staff of the Delhi Centre early in 1973. This meeting was held early in January 1973 at Delhi, where some general decision were arrived at with regard to certain procedures for data processing, which could be adopted by all centres, at least for those portions off the data that were common to all centres. How fruitful and pragmatic this meeting was can be gauged by the fact that the general procedure recommended at this meeting, was adopted by most centres, for preliminary processing of their data.

It has to be pointed out at this stage that, the design for this study conducted by the Varanasi Centre, underwent many modifications and revisions, both in the light of experience of pre-tryouts, tryouts and pilot study findings, discussions and criticisms made in Honorary Project Directors' meetings and suggestions received from other centres. It will be superfluous to trace the nature of changes that have been introduced in the original design, as a result of which the final version emerged. Instead, the final version of the research design would be presented and discussed. A few major changes that had to be incorporated over the original version of the design would be mentioned, because that would throw light on the major orientation of the study conducted by the Varanasi Centre.

The above historical sketch rather briefly narrates how the Varanasi Centre came into the picture, to participate in this nation-wide study in educational psychology which is of considerable importance for educational planning and practice. Because of the built-in-flexibility in drawing up of the design of the study by each centre, each of the seven studies will have something unique to contribute to the general pool of knowledge and understanding resulting from the intimate collaboration and

cooperation between the seven centres around an irreducible minimum of common core of variables shared by all the centres. The proposed design of the Varanasi centre, as it finally emerged after the pilot stage, had also a fair share of unique features, which substantively provided direction in formulating the basic design of the present study. In the next chapter these factors, which were instrumental in shaping the design of this study will be described first. Certain basic premises were enunciated and accepted from the beginning. The formulation of the design, and its subsequent revisions by which it assumed its final form as logical consequences following from those premises will thus become meaningful and of scientific value.

Chapter 2

SPECIAL FACTORS OPERATING IN THE FORMULATION OF THE VARANASI CENTER STUDY

Originally the study was meant to be a comprehensive exploration into the nature of relationship between two broad classes of variables. One is what may be called the environmental variables - related to processes operating in home conditions of the child, and in the school where he is studying. This class of variable has the standard, generic nomenclature of independent variables. The second category of variables consists of those which are related to the developmental functions of the child - in the cognitive, emotional and social spheres, usually indexed by the level of performance of the child in school subjects, and in patterns of his behaviour in the social-cultural areas. The generic name for this class of variables is 'dependent' or 'consequent' variables.

The present author, from the outset, held that, this above model, entailing one-to-one mapping of the independent variables on one hand, to the dependent variables on the other, is too simplistic a picture of the pretty complicated processes that underlie the locus of development of the child, in which many forces, from the outside,environment, as well from within the child, resulting from psychobiologically determined maturational processes, complexly interact, and monitor the actual level of performance and functioning of the child. In other words, an additional category of variables has to be invoked to conceptualize this intricate nature of the interactional processes which characterize the development of the child in the psychological-social sphere. This class has been termed the "Intervening " of "mediating" variables in the study, because the model assumes that variables belonging to this class, mediate or intervene between the environmental processes on one hand, and specific psychomotor and social behaviour patterns on the other. The difference between the two models is shown in Figure -1.

Independent Variables	Dependent Variables
Environmental processes of home and school	Level of functioning: cognitive, emotional, conative and social

(a)

Independent Variables	Intervening Variables	Dependent Variables
Environmental processes of home and school	Attitudes, Values, Skills, Aptitudes, Interests Intelligence	Level of functioning: cognitive, emotional, conative and social

(b)

Figure - 1

Figure 2-1: Two Models of the developmental processes:

(a) The simplistic 2-category model

(b) The sophisticated 3-category model.

Some of the advantages that accrue from conceptualizing a three-category model rather than a simple two-category model may be briefly enumerated here. The first advantage is that of more comprehensive coverage of the undoubtedly complex processes of development that the child is undergoing. The second advantage is the possibility of greater precision in prediction of the developmental outcomes. The third advantage is of greater flexibility in handling the theoretical underpinnings of the developmental processes. This arises from the variety of ways in which the data lend themselves to be analysed: the data may be so analysed to treat the intervening variables as truly mediating between the antecedent or independent variables on one hand, and the consequent, or dependent variables on the other. Alternatively, the data may be analysed by treating one or more, or all of the intervening variables as if they are also dependent variable. The present study may explore the possibility of establishing with some degree of certainty whether, and if so which, any of the variables defined as intervening variables, are truly behaving so, mediating between the antecedent and consequent variables. Such analysi has interesting theoretical implications.

The next important feature of the design of the Varanasi centre was the coverage of the entire district of Varanasi, with equal weightage for the urban and rural schools. It is usually a matter of expediency to confine studies of thi nature and scope to schools located in the urban areas. To cover schools in rural areas, some of which are situated in

comparatively inaccessible areas, creates administrative difficulties. But, neglecting to cover such remote schools would only produce an incomplete picture of the true educational situation of the country. Therefore, a firm decision was taken to have adequate coverage of the entire district of Varanasi in the selection of sample schools to be studied. Varanasi is a sprawling district, the major axis of its spread being from west to south-east, covering a distance of not less than 150 Kilometers. It was intended that the variability inhering in this spread of the district - from the fertile Gangetic planes in the west to the Vindhyan hills and forest lands in the south-eastern extremity should be adequately reflected in the sample of schools to be studied.

Some of the collaborating centres had decided to investigate in detail the contribution made to the development of the child of those processes which may brought under the rubric of parent-child inter-actional variables. The scientific value of such a class of variables in understanding the developmental processes is undeniable. However, so far as the study design of the Varanasi centre was concerned, it was decided that this class of variable, named in brief as 'parental interactions' would be excluded from the purview of this study. In fact, any variable that would entail individual contact with the parents of the sample of children being studied, and/or detailed interviewing them, was scrupulously excluded from the purview of the study. It was thought this would introduce overwhelming workload, as contacting parents in rural areas involves many hurdles which could not be overcome without over-stretching the limited resources available for the project.

The last important characteristic of the Varanasi centre design was to be the relatively greater emphasis on the multivariate aspects of the data likely to be collected, and naturally the methods of analysis that would be appropriate for such data.

The univariate approach is a neat and meaningful way of viewing relationship among categories of data. The multivariate approach, which involves a logical extension of the univariate approach to several dimensions together, helps in obtaining a more powerful perspective of the intricacies inherent in the data. But there are two other additional

advantages: (1) There results tremendous economy of effort in multiple comparisons among a plethora of variables. (2) If prediction of certain outcomes is one of the aims of the investigation, multivariate methods are the most powerful methods so far derived by the human mind in ensuring accuracy and precision in prediction. It was, therefore, decided that wherever feasible, multivariate methods of analysing data would be resorted to in this study, in addition to the standard univariate methods that are routinely followed in studies of this type.

The basic model for this study shared features of several types of models currently available in literature. A good portion of the study had to be exploratory in nature. At the same time, there is a fund of information available about various components of the developmental processes under study, on the basis of which certain hypotheses could be formulated in advance to be tested in course of the study. The model, therefore, framed here, is of the 'mixed' type- in the sense of permitting certain questions being put, as well as testing certain predictions made on logical grounds.

From a model of the type envisaging a number of variables within each of the three basic categories defined above - viz., independent, intervening and dependent - it follows that the amount of data generated would be quite substantial. But more importantly, to meet the end of two types of data analysis - one exploratory, and the other hypotheses testing - a very large quantity of statistical computations was called for. Accordingly, it was decided that the data processing and analysis for this center would be through computerization. For this purpose, adequate provision of funds in the budget proposals was made.

Coming to the operational side, a study of this scope and coverage, involving a lot of try-out and pilot investigations, successful completion of it depended upon very careful phasing of the entire research. The phasing had to be realistic, and was to be subject to constant revision and refinement, in the light of actual targets achieved. Phasing thus became a crucial aspect of the Varanasi center study. The phasing of the Varanasi study will be described in considerable detail in a later chapter, as it will be seen to have some gol

lessons for the planning and administration of such studies in the future.

Field studies inevitably have to face certain peculiar problems, without solving of which the quality of the studies cannot be assured. Over and above that, within that field-situation when data have to be collected scientifically, with standardization and of as many extraneous factors as possible, new difficulties are faced. Special training of the research staff is an essential prerequisite. Very careful attention to meticulous preparation for the testing of young children under conditions far from the ideal that can be obtained in a laboratory calls for resourcefulness, determination and innovativeness of a very high order. The enormity of the research effort can be gauged from the fact that the same routine had to be repeated from school to school, from one area to another, and from one phase to the next.

A research report, by its verv nature, comprizing distilled findings from the entire research operation, which is generally prolonged and complicated, contains very little material on the innumerable ramifications and intricacies of its operational processes. But there is a place of such details in the training and heuristic functions of all new research endeavours. Therefore, this report proposes to give sufficient coverage to the operational features of the study. Reports, by and large, do not give space to this feature. This, according to the present author, is not correct. At least two classes of persons need such information, and in good measure. One is the administrators of funds and policy-makers. They should be acquainted not merely with the finished product of a research, but also with the processes that have to be invoked for obtaining the end product. Lack of knowledge of the procedural complexities that beset all such studies cannot but produce lack of total understanding and consequent rigidity. Secondly, new researchers, and students, require such procedural information. Much of the trial and error resorted to by the beginning researchers can be eliminated or reduced by providing them concrete information of actual procedural complexities accompanying any good research.

This is one apology for the bulk of this report, in which any attempt to be unnecessarily brief has been eschewed. Instead, full details have been provided to make the record as comprehensive as possible. Even in the analysis of data, over-computing was not avoided, as no decision was made from the beginning as to what would be relevant and germane, and what would not be so.

With this introduction, we can now turn to the study proper.

Chapter 3

AIMS, OBJECTIVES AND GOALS OF THE PRESENT STUDY

General Consideration : The process of development of the child, from its birth to about 5 or 6 years of age, has been subjected to both intensive and extensive study; in fact, some of the most fascinating superstructure of psychological theory building has been erected upon the postulated psycho-sexual stages of development through which the child is supposed to pass during his infancy. Again, the entire tradition of psychometry and the measurement movement in psychology was intimately related to developmental processes epitomized in the growing child. Psychometry, born with the attempts to measure intelligence, and later other psychological functions, quickly provided the fabric out of which the theory of differential psychology was built up, under the leadership of W. Stern (1900), whose Uber Psychologie der individuellen Differenzen became the forerunner of much systematic work done in the subject of individual differences.

Thus psychological theory on one hand and intensive longitudinal study of the process of growth and maturation of the child on the other, have formed two mighty streams, in which the focal point of interest has been the growing child.

The methods and contents as well as the focus of interest of studying the neonate, the infant and the growing child are quite different. In the neonate, and the infant, more in the former than in the latter, the biological aspects of behaviour predominate, whereas in the latter what may be called psychological aspects proper begin to emerge, and assume increasingly greater importance. For example, for very small infants, the very concept of brightness or dullness is of little value; nor have we any meaningful measures of intelligence. For very young infants, what are called "developmental scales" are available, and are meaningful, just as "intelligence scale" become meaningful only after 2 1/2 years, and more appropriately after 5 years of age.

Arnold Gesell's longitudinal studies (1948, 1954) of the growth process of the individual child can be rightly considered as classics. The authoritative chapters by a host of authors in Leonard Carmichael's (1954) Manual of Child

Development sort of lay down the model for research in developmental psychology upto the first half of the present century. This is not to say there was any dearth of perceptive studies of childhood before that; but where objective and systematic observation that is hard science ended, and lore tookover, was not easy to judge. Such important methodological innovation as 'co-twin control' was a product of this age.

Certain important changes began to characterize research in child development of the later fifties, sixties and early seventies. The first change is seen in the increasing recognition of the complicated charater of the influences exercised by the environment - in contrast to the innate or genetic factors - upon the growing child. This is also related to theories of child rearing practices, which became fashionable during late thirties and forties. Controversies of various types erupted with regard to the nature and importance of 'mothing', and damage, supposed or real, resulting from 'maternal deprivation' or 'maternal overprotection'. A good summary has been provided by Casler (1961), of contrasting findings reported by two contending groups of students of child development, one represented by D.M. Levy, Margaret Ribble, John Bowlly, Rene Spitz and W. Goldfarb, and the other by J. Anderson and Samuel Pinnean. A recent report by Amita Verma (1970) deals with studies in child rearing practices in the Indian setting. The study reported by Sears et.al. (1957) remains a classic due to its methodological innovations. The complexities of processes subsumed under child rearing practices in particular and socialization methods in general, enriched by a number of cross-cultural studies pioneered by Whiting and Child (1953) have been underlined by the distinctive contributions by Mussen and Conger (1956), Hunt (1963) and Baldwin (1967), to name only a few.

The second transformation can be traced to the influence of Jean Piaget and his school which has made very striking investigations into the logical constructions of the cognitive functions of the child. The emphasis is away from the statistical treatment of group data, and concentration upon the single child, in the grand European tradition of the ideographic approach in contradistraction to the nomothetic, cross-sectional approach popular in the United States. For an authoritative summary of the work of the Piaget School one may refer to the

book by Ginsburg and Opper (1969).

The third major area of change has been concerned with the increasing use of ingenious, sophisticated, standardized tests and instruments for precise measurement of various aspects of the child's growth. The volume by Johnson and Bommarito (1971), entitled Tests and Measurements in Child Development: A Handbook, provides a good example of progress made in this field. This contains a lot of factual information about tests, and scales, suitable for studying the neonate and the child upto 12 years of age. Precision of measurement as distinct from qualitative or global assessment is emphasized in this approach.

As more and more systematic data are collected on the basis of test performance by carefully selected samples of children comprizing different age groups, norms of different types can be established - such as age norms, grade norms, sex norms, and even regional norms. What is more interesting and promising is that norms of even what used to be considered purely qualitative tests at times can be established. In this connection, the excellent work of Ames and Ilg (1962) on the establishment of norms of mosaics designs made by representative samples of American children varying from 2 1/2 years to 14 years, using Lowenfeld's Mosaic Test is a good example of this remarkable trend.

Another trend which has characterized research in child development is an increasing recognition of the view that the locus and rate of development of the child are to a certain extent culture-specific. The spurt in cross-cultural, cross-national, and cross-continental studies of the late fifties and sixties has underlined this 'unity in diversity' in the norms of child, adolescent and adult behavioural development patterns. Each nation, each ethnic group, even each community contributes something specific to the growth pattern of their own children. Therefore, normative trends of child growth of one culture may not be fully generalizable to or comparable with those of other cultures. The need for developing separate national and regional norms becomes imperative, an assumption which appears to be implicit in the NCERT (1964) Symposium on Child Development. This work draws upon research experience accumulated within the country rather than abroad.

In most studies in developmental psychology an idea seems to be implicit that the growing child passes through distinct stages - one stage being sharply different from the next on certain counts. Classical psycho-analysis postulated three district psycho-sexual stages within the infantile period. The period following the infantile period, called latency period is considered to be characterized by a relative quiescene of the psycho-sexual modes of behaviour. With the onset of puberty, there is a recrudescense of the psycho-sexual urges. Again, even the entire adolescence period has been thought to consist of three or four district stages marking emergence of clear-cut psycho-sexual functions. This orthodox Freudean view of sequential and well demarketed stages of development has not gone uncontroverted, in the light of much empirical evidence collected so far. However, the combination of cultural and genetic factors determining certain postulated transition points in the life of the child is so formidable, that most studies in developmental psychology have to take it into consideration. The present study also reflects this cultural-genetical constraint, by confining itself to children between 5½ to 11 years.

Along with maturational processes which take place over a period of time, another process, that of socialization, makes important contribution to development. Socialization, though started early, is strictly enforced only after the child is past infancy. At this stage, the child is initiated to a programme of cognitive-motor-social training. The emphasis is more overt on cognitive and motor skills, rather than on social competences. The actual mode and style of socialization varies across communities along a number of dimensions, such as the agency of socialization, the instrumentalities used, the behavioural outcomes encouraged, schedules of reinforcement used, and the degree of strictness of enforcement of discipline. That the harshness or permissiveness of the socialization process affects development of personality traits seems to be accepted by a member of psychologists and anthropologists. Whether motor and cognitive development are also affected in the same manner is still a researchable question.

The scope of socialization is tremendously widened and enriched by another agency - the school. On the basic process of growth and maturation, largely determined by genetic and biological factors, are super-imposed two concurrent socialization influences - which are complimentary to each other. One is the environmental modulations emanating from the home and family. The other is the influence exercised by the psycho-social processes of schooling. Admittedly, both these broad streams of influences are embedded in the social-cultural milieu within which the child is born, and brought up. At this point, the synthetic, interdisciplinary nature of the concept of 'development' needs to be underlined: it refers to that total, integrated, on-going change, towards greater organization, greater coordination, and greater sophistication and precision that takes place within the child in terms of his cognitive functions, his emotional inter-actions, in his social skills, and in his values, interests and attitudinal build-up.

In our country, the bulk of children, who does at all, enters school at 5 to 6 years of age. This does represent a sudden transition for the child. On one hand, new types of inner psychological processes have been initiated within him, with a certain graduation and moderation - nursing him to make adjustments to new demands and challenges - encouraging and reinforcing his search for freedom and desire to explore and experiment with his social and physical environment. But by displacement in the group setting in the school, some of the modeling devolves upon his peers, in addition to his teachers, which calls for newer types of adjustments and disciplinning.

New demands are made upon him; trials are repeated to stamp in new behavioural modes; schedules of reinforcement are altogether different; even the quality of reinforcement is different - negative reinforcements like punishment, withdrawal of affection, disapproval, etc. coming in place of positive reinforcements, used so lavishly so far. Most important of all, the child is made to pass through a toughening mechanism; he is made to learn that some of the goals and ends coveted by him cannot be immediately gained, or gained by showing his anger, resentment, aversion, or revolt. Above all, he is made to learn that he has to perform certain social functions, and conform to certain social norms, for his very survival in the group.

The success of the educational aim, and therefore of the schooling undergone by the child is seen in the extent that the child makes these new adjustments, if we take a deep and long term view- rather than a superficial view of the aims of education. The usually accepted index of educational development of the child is his level of achievement in the school curricular activities. But acceptance of the school examination marks at face value as an index of educational attainment, pure and simple, is hazardous, as it is well known that examination marks usually lack both reliability and validity. In any case, instead of accepting the school examination scores at face value, we should also recognize that these are complexly influenced by the cognitive - social- emotional growth processes going on within the child. These, in turn, are subject to environmental forces acting upon the child - from his home and family, his neighbourhood, his community and his school. Taking these complexities into account, will be a corrective to expect only uniformities and the regularities in the class-room, rather than variability and differentiation.

This study proposes to make a beginning to fill up the gap in our knowledge concerning this complicated process of the integrated growth of the child, at two crucial points in time - one, when, at the end of infancy he is entering school, and the other when he is leaving boyhood or girlhood, and entering the threshold of adolescence.

The findings of such a study will hopefully show how the educational programme obtaining in our school system can be geared up to meet the individualized growth needs of each child in an optimal fashion. This may provide us with new insights and understandings into the complex phenomenon of "school achievement" so that they can be moulded to become dynamic ingredients of the total growth of the child, in which wastage and stagnation will be controlled if not minimized or eliminated. It can be expected that various methods comprizing the teaching - learning activities of the schools, will be better understood, the contribution of this study being on the development of basic perceptual processes, logical relations, cognitive - adaptive responses and social-inter-personal behaviours of the school-going child.

Aims, Objectives, and Goals : General

This is essentially a study of developmental psychology of the school growing child of a particular age group, viz. 5½ years to 11 years. The child comes to the school with certain basic equipments and skills, some of which are already functional and some are merely potential. He may be viewed as being subjected to many different types of influences which can be broadly divided into three major categories:

(i) Those which originate from the inner processes of his growth and maturation;

(ii) Those which emanate from his home and family environment;

(iii) Those which are exercised by the organizational-environmental process of his school.

The general objective of this study, to be conducted on a representative sample of children of the district of Varanasi is thus seen to make a systematic investigation into the ways in which these three major factors act and interact to determine the locus of development of the child, broadly understood in terms of the growth, maturation, and acquisition of certain functions in the intellectual cognitive, and social-emotional spheres.

Making judicious use of already developed conceptualizations in the field of developmental psychology and related areas, and of known research findings, we can envisage the following model for the present study.

Level I Independent Variables	Genetic Equipment			
	Home and Family Environmental Factors	Ecological factors of Neighbourhood	Environmental organizational factors of the School	
Level II Intervening Variables	Cognitive functioning.	Social Maturity	Social acceptance and skills	Emergent Moral Values
Level III Dependent Variables	Language skills	Mathematical skills	Perceptual organizing Abilities	

Figure 2-2 Basic Model of the Study

Three points are worth mentioning at this stage, with regard to the above model:

(a) The three boxes, representing three levels, are shown to contain only a limited number of variables each. Admittedly many more variables could be put in each of these three boxes. The variables that have been put there reflect the choice made by the design of the study, in the light of limitations and constraints within which it has to be carried out.

(b) The boxes are by no means water-tight compartments, but are porous and elastic. The subsets within each box are also porous and elastic. The interactions between the three boxes, and within each of the boxes are not one-way, but multi-way. The placement of the intervening variabl[e] in between the independent and dependent variables is a conceptual convenience, and do not prevent direct interaction between Level I and Level III factors.

(c) Lastly, the placement of certain factors within the box of Level II, is also a matter of conceptual convenienc[e] or artifact. Nothing prevents one from viewing one or more variables within this box to more appropriately belong to the Level III box. For example, 'level of cognitive functioning obtained' is being conceptualized here as a factor mediating with the performance of the child in language and numerical tasks. It is also implicit that besides his genetically inherent mental ability, its level of functioning has been at best partially determined by environmental factors, operating from the home and the school. Another research can conceptual[ize] intelligence as a purely dependant variable, just as perform[ance] in language and mathematical tasks are. The same arguments may apply to social skills, to moral development, and so on. So far as this study is concerned, the above basic model seems to logically emerge from the overall goals of the study spelle[d] out above.

The above model is presented as a simulation of the developmental processes conceptualized to provide the essenti[al] backdrop of the present study. It will need translation into

a research design, that is an operational plan-frame, which will permit testing certain conclusions that logically follow from the process-model. This is done in the next chapter. The specific aims of the study can then be spelled out in greater detail, in the form of certain questions to be answered, and in the form of certain hypotheses to be tested. The instruments that can be used, the procedures to be followed for collecting the data required, and methods and techniques to be used for analyzing the data, all will logically follow from the research design. These are described in the next chapter.

Chapter 4

METHOD

In the previous Chapter the basic model of the process of psychological development in the school going child has been presented, although in a simplistic fashion. One great advantage of having such a model is that the entire 'method' to be followed for conducting the research can be derived more or less logically from it. In fact, all the major decisions for the investigation also follow from the research design, according to certain logical principles, as will be shown below.

Design

The universe for this tudy will consist of school going children of the entire Varanasi district who belong to the age range of $5\frac{1}{2}$ to 11 years, and at the time of the study are reading in either Grade I, Grade II or Grade V. Children sampled from Class I should be between $5\frac{1}{2}$ to $6\frac{1}{2}$ years of age; and children sampled from Class V should be between $9\frac{1}{2}$ to 11 years. In this way, the age distribution will be bimodal, with two ranges; one between $5\frac{1}{2}$ to $7\frac{1}{2}$ years, and the other between $9\frac{1}{2}$ to 11 years. The total sample size will be around 600, 300 for children sampled from rural schools, and 300 for children sampled from urban schools, divided proportionately between the two sexes, the number of schools being more or less equal between urban and rural areas.

The sample children's current level of functioning along certain psychological dimensions will be measured by administering either standardized instruments, or tools specially devised for the study. Information about the home, family and parental background conditions as well as about the standard and nature of the schooling undergone by the children will also be collected. Lastly tests for measuring and arithmetic, along with a test of the capacity for imaginative organization, viz., the Indian adaptation of the Lowenfeld Mosaic Test will be administered to the sample subjects.

The information collected including the scores made by the subjects on the set of tests administered to them are considered to belong to three conceptual categories : (1) Independent variables - these including parental characteristics, home background factors, the standard and quality of schooling, location of schools, age-grade and sex of the subjects; (2) Intervening variables, include social maturity, moral relativism, intelligence, and social acceptability; (3) the dependent variables include tests of achievement in language, arithmetic, and Indian adaptation of the Lowenfeld Mosaic Test. The nature and extent of inter-relationship between and within the three major categories of variables will be

statistically analysed, to throw light on the contribution made by home and school factors on the process of development of the cognitive, affective and social functions of the child.

Further, how different groups of children, grouped on the basis of various classificatory categories, differ with regard to the variables belonging to the three major classes of variables will be studied by appropriate statistical techniques. Age-grade, sex, location of school, type and quality of schools attended, parental conditions, including their socio-economic status are the variables that can be used for forming different groups. An attempt may also be made to develop appropriate statistical formulations for predicting performance of children in school subjects like language and arithmetic in terms of their standings in the independent, and intervening variables. The overall approach of the research design and data analysis will be the multivariate one.

Sampling

Multistage sampling will be resorted to for choosing subjects for this study. A combination of quota sampling with randomization will be used for the entire sampling procedure. The steps in the sampling will be as follows :

For Urban Schools

(a) A complete test of all primary schools within the corporation area of Varanasi City will be prepared, in consultation with the offices of the Chief Inspector of Schools and Regional Inspectress of Schools. Names of as many private and unaided schools as far as can be ascertained will also be included in the above list.

(b) Two lists will be made from this master list - one of aided schools, and the other of unaided schools.

(c) A total of 15-16 schools are to be chosen from these two lists ; the number to be drawn from each of the two lists will be approximately in the same proportion as between that of the number of schools in the two lists - rather, the number of schools from the unaided schools list will be increased a little. Choosing of the schools from the lists will be through the use of random numbers.

The proportion of purely girls school, as compared to boys school, chosen in the sample of 15 to 16 schools, is expected to reflect their proportion in the universe of all schools of the city corporation area, from which the sample is being drawn. The number of girl's school is much smaller than that of the boys schools. There is no question of

parity between boys schools and girls school. However, the proportion of girls in the sample is expected to be higher than in the universe of all school going children (of this age range and of these three grades) of both sexes, due to two factors :

(i) Most of the un-aided private primary schools are co-educational. Therefore, these will contribute some girls to the sample.

(ii) Any primary school in the state, is, in principle, co-educational, unless it is strictly designated a girls school, and therefore a few sprinkling of girl students are to be found in most primary schools, and more so in the rural areas, then in urban areas. These will also tend to inflate the female proportion in the sample.

It is also expected that the proportion of large, medium and small schools in the universe will also be approximately maintained in the sample of schools drawn in this way, through randomization within each list.

For Rural Schools

(1) First a master list of all schools of the district of Varanasi will be prepared in four parts, corresponding to the four tehsils of Varanasi, viz., Sadar, Chakia, Chandauli and Bhadohi. Only those schools receiving aid from the Education Department, and which do not fall within the corporation limit of Varanasi City, will be included in this list.

(2) About 4 schools would be chosen from each of the 4 lists by using tables of random numbers.

For the sampling of rural schools no distinction will be made between aided and private, (private unaided primary schools in rural areas of Varanasi are very rare, if not non-existent), and boys and girls schools. In the rural areas there are quite a few primary schools for girls only. But their inclusion or not in the sample will be strictly a matter of chance.

Selection of Subjects

In the last stage, subjects are to be chosen from the three grades, I, II and V. The exact procedure to be followed is described below :

(i) The class register for class I is first secured, and a list of all students in the class, alongwith their respective enrolment numbers, is prepared.

(ii) The school register is then consulted, to identify all those students whose ages on the day of selection, fall between 5½ years to 6½ years. Rejecting all those students whose ages exceed 6½ years or are below 5½ years, a new list is prepared.

(iii) From this list, by strict use of the randomization principle, 7 to 10 students will be chosen, depending upon the size of this list. The size of this list will not usually exceed 20, but will be usually much less. Thus anything from 50 to 100 per cent of all students whose age fall between 5½ to 6½ years on the day of first testing will be included in the sample. It is quite possible that from a particular class even the minimum number of 7 students will not be available to constitute the sample.

If there are more than one section of the same grade, then the entire sample for that grade will be proportionately distributed among those sections, rather than selecting all students from the same section.

(iv) This procedure is repeated for Grade II and Grade V.

In this way, it is expected that about 20 students will be chosen from each school. In some cases this number may fall below 20, and in some cases this number may somewhat exceed 20. This is the method to be followed for constituting the original or master sample of subjects who will be administered the entire battery of tests in three or four rounds, spread over almost 6 to 9 months. With an expected sample attenuation of 20 -- 25%, a final sample of 300 for both rural and urban schools will thus be assured. Sample attenuation is sure to occur, due to illness, casual absenteeism, and drop-outs.

Instruments and Tools

The instruments and tools to be used in this study are meant to correspond to the factors that are conceputalized in the three categories of variables as delineated in the basic model of the research design shown in Figure 2. The tools to be used are listed in Table 4-1 shown below.

Table 4 - 1

List of tools to be used in the study

I. Independent Variables Group	Tool
Inherent Background Factors	
Sex	—
Age	Determined from school record

Table 4 -1 (Contd.)

Variables	Tools
Home-Family Background Factors:	
Parent's Education	Special socio-economic status schedule prepared for this study
" Occupation	
" Income	
" Religion	
" Caste	
" Socio-economic status	
School Environmental Factors:	
Teacher Qualification	School facilities scale specially prepared for this study by the Bangalore Centre
Teacher-Pupil Ratio	
School Equipment	
Ecological Factors of Neighbourhood:	
Location of School	Schools sampled from urban and rural areas
II. INTERVENING VARIABLES	
Emergent Moral Values	Moral Relativism Scale specially framed by the Hyderabad Centre
Social Acceptance and Social Skills:	
Popularity and Group Acceptance	Sociometric Test developed by the Varanasi Centre
Social Maturity	Social Maturity Scale developed by the Bangalore Centre
Cognitive-intellectual functioning:	
Mental Age	Porteus Maze Test
Intelligence Quotient	
III. DEPENDENT VARIABLES	
Language Skills	Achievement Test for Hindi developed by the Delhi Centre
Mathematical Reasoning Skills	Achievement test for mathematics developed by the Delhi Centre
Perceptual Organizing Abilities	The Indian Adpatation of the Lowenfeld Mosaic Test developed by the Varanasi Centre

So far as the Varanasi Centre study is considered, as many as 9 different instruments are proposed to be used, not counting the sub-scales or parts within some of the individual but composite tools. Out of these 9 instruments, only one, viz., the Porteus Maze Test is a well-known internationally standardized test of general intelligence of the nonverbal type. The Indian Adaptation of the Lowenfeld Mosaic Test is also a standardized tool, in the sense that the original Mosaic Test is standardized, and its adaptation has also been standardized over a number of years. The Sociometric Test is also a standard tool in that sense. The remaining six instruments will be tools specially fabricated for this study; two of these will be supplied by the Bangalore Centre, two tests of performance in school subjects will be supplied by the Delhi Centre, one will be supplied by the Hyderabad Centre, and the remaining one devised by the Varanasi Centre. Table No. 4-2 shown below gives the source of these 9 tools to be used by the Varanasi Centre.

Table 4-2

Centre-wise Sources of Tools to be used for the Varanasi Centre Study

Centre	Tools
1. Delhi	1. Language Achievement Test
	2. Mathematics Achievement Test
2. Bangalore	3. School Facilities Scales
	4. Social Maturity Scale
3. Hyderabad	5. Moral Relativism Scale
4. Varanasi	6. Indian Adaptation of Lowenfeld Mosaic Test
	7. Socio-Economic Status Schedule
	8. Sociometric Test of Popularity

<u>Procedure</u>

Inspite of the relativity modest size of the sample, expected to be about 600 at the final counting, the study can be considered to be a large one due to its coverage, in terms of the number of variables to be tapped. Scientific control of extraneous variables is proposed to be combined with field methods of data collection. Moreover two-thirds of the subjects of the study will be rather young children who tire easily. Careful phasing of work is of enormous importance in this study and the procedure to be followed is best understood in terms of the phasing planned for it.

In the earlier stages of the study, tools will be prepared and tried out in a few schools, and in the light of this experience they would be finalized. When all the tools are ready, these will be used in a pilot study which will anticipate the final study in all aspects save in the size of sample, being only one-tenth of the final sample. In the light of the experience and findings of the pilot study, both operational details of the procedure for administration of tests, and the duration of the phasing, will be finalized.

Whereas the constitution of the school sample will be completed during the pre-pilot, preliminary stages, the constitution of the actual subject sample will be deferred until the first round of the study proper is taken up. This is to be done within a period lasting not more than 8 months of the school session.

The administration of the 9 instruments will be done in two or three rounds. The first round will start in late August and last upto the end of October, or even spill into November. The second round of testing will commence in January, and will end by the end of March. An extra, final round may be necessary in April, for catching stragglers, that is, those subjects who had appeared in tests administered in the first round, but were absent in the second round.

In the first round, the following 5 tests will be used :

(a) School Facilities Schedule
(b) SES Schedule
(c) Porteus Maze Test
(d) Indian Adaptation of the Lowenfeld Mosaic Test
(e) Social Maturity Scale

The subjects are required to respond, on an individual basis to only three tests, viz., the SES Schedule, the Porteus Maze Test, and the IALMT. The remaining two tools, viz., the School Facilities Schedule, and the school, and the subjects are not required to respond to these tools.

In the second round, the following 4 tests will be used :

(a) Sociometric Test
(b) Moral Relativism
(c) Test of Achievement in Hindi
(d) Test of Achievement in Mathematics

The first test, Sociometric Test of popularity is adminstered as a group test in Grades II and V, but as an individual test in Grade I. Likewise, the Moral Relativism test is administrable as an individual test in Grade I, and as a group test in Grades II and V. Both the achievement tests are meant to be group tests, though in grade I, to treat them as individual test may be called for.

It would be ideal to administer the two school achievement tests, only towards the fag end of the school session, i.e. in April, just before the examination. For administrative and oppositional reasons this has to be spread over 3 or 3½ months.

After the final round is over, which is to be completed before the school closes for summer vacation, in which tests are administered to the stragglers in certain schools, the data processing will start. The tests are properly scored and tabulated in master sheets or rosters. These are then coded and scored for punching on IBM cards. The coded scores are carefully checked once, before obtaining punched data cards from the same. The printouts ("listings") of the coded scores are carefully checked to locate mis-punches, and new corrected cards made. While certain cross-tabulations are to be done manually, most of the statistical testing of the data will be computarized. On the basis of the results obtained from the detailed statistical analysis, the final report will be prepared.

Processing of Data

The entire processing of data collected from this study can be viewed to consist of several distinct stages :

i. Data treatment
ii. Data processing and arrangement
iii. Data analysis for descriptive statistical purposes
iv. Data analysis for inferential statistical purposes

Originally, data will be generated in the form of responses given to items of the instruments -- obtained from records (such as age, and grade of the subject), observation (sex of the subject), from staff (such as social maturity of the subject), and from the subjects themselves. Data treatment refers to those operations to ensure completeness, accuracy, unambiguity, standard nomenclature, etc. of the data collected,

Processing and arrangement of data, refer to such operations as scoring, (either qualitative or quantitative), coding of score

categories, transformation of scores, by codes, or by special formulas, and deciding about the format or structural arrangement to be followed for presenting the data. Careful decisions are required to be made at every stage. For example, presentation of a result of the administration of a particular test may be done through actual raw scores, or through summaries such as frequency distributions, in which case the size and the starting point of the class interviews are matters of choice. Results of how many variables and which variables are to be shown together are all matters of careful decision. All these decisions cannot be made at an early stage, and must wait until the final data have taken some shape due to data treatment.

In data analysis proper, when the exploratory purposes of the study are taken under consideration, the data will be arranged with a view to answer certain questions with regard to the psyhological processes under examination using various cross-tabulations of scores from different sets of variables, certain summary statistics about the distribution properties of the variables under study, such as their central tendencies and dispersion are computed and presented. Certain over-all trends will become apparent from thoughtful presentation of summary statistics, through tables of single variables, and cross-tabulation of two or more variables, even if only marginal frequencies, and their percentages, means and measures of dispersion are also reported.

Data analysis, with regard to inferences that can be drawn from th the nature of the distribution of data, using univariate, bivariate or multivariat approach, is best conceptualized and carried out in terms of explicitly stated hypotheses to be tested by appropriate statistical techniques. It will not serve much purpose to write in detail and exhaustively all the hypotheses that could be tested. For one thing, because of the nature of the distribution of scores of certain variables, it becomes apparent that any elaborate or sophisticated statistical testing is wholly unnecessary or redundant. Again, in certain cases directional hypotheses may be stated quite precisely; in other cases, only general non-directional null hypotheses may be formulated. However, formulation of at least the major classes of hypotheses is a requisite step of all good research design itself. In the following section the more important hypotheses that are proposed to be tested are listed.

Hypotheses to be Tested

Let us go back to the basic process model shown in Figure 2-1 the basic research model following from it Figure 2-2, and the listing of variables and tools to correspond to them in Table 4-1. The variables

put under the category of 'intervening variables' are tentative or heuristic. Some experts may view them as independent variables; others may treat them as dependent variables. One justification for treating this class of variables separately is this : the child can do little, if at all, to influence or modify the independent variables - they remain fairly constant. But variables under the second category (intervening), are mainly interactional in nature: the child's responses serve as feedback, modulating or monitoring the reactions from actors in the environment. Even a variable like intelligence will thus be considered to be an intervening variable, because evidences are not wanting to point out that environmental stimulation determines the ultimate level of intelligence (and also a host of other functions such as perceptual processes, and of course social interactions). Again, therapeutic measures taken by parents to accelerate dull offsprings may affect level of cognitive functioning. These two classes of variables, together or separately may determine the outcome or performance tapped by the dependent variables. Attempt may be made, by invoking appropriate statistical techniques to see whether indeed the intervening variables so defined in this study, behave thus in the mediating fashion as postulated.

In the face of the unclear and complicated nature of findings with regard to the disposition of almost all the variables proposed to be studied in the present investigation, we are on safe grounds to assume that processes subsisting between three classes of variables are not always directional, but are reactional - some variables affecting some other variables, in one direction or the other, and in varying degrees. A scheme has to be set up, under which the various hypotheses that can be tested can be formulated, or indications made as to how they could be formulated.

Scheme for Formulating Hypotheses

The various hypotheses that can be tested are put into three major categories :

I. Hypotheses concerning the nature of performance in the school subjects, and IAIMT, as a function of the variability in the

(a) Background variables

(b) Parental variables, and

(c) School facilities variables.

II. Hypotheses concerning the nature of scores obtained by the subjects in the intervening variables as a function of the variable in the same three categories of independent variables.

III. Hypotheses concerning the nature of inter-relationship between scores obtained by the subjects in the intervening variables on the one hand, and the dependent variables on the other.

There are also possibilities of testing certain hypotheses following what may be called the multivariate approach with regard to the antecedent variables, as well as with regard to the dependent variables being considered together, as a vector, as is done in the multiple analysis of variance, or in canonical correlation.

Keeping the above scheme in view, some hypotheses can be formulated in precise terms. As pointed out earlier, it will not be useful to give an exhaustive list of such precisely formulated hypotheses. But some examples of the type of hypotheses that will ultimately be subjected to statistical testing will be given a little later. The list can be expanded very greatly. But certain principles may be stated here to follow how the same types of hypotheses testing can be repeated with certain changes with respect to groups to which each hypothesis refers.

The independent variables are seen to have different levels arranged in a hierarchical fashion. Sex of the subject, location of school, and age-grade are the basic variables at the primary level. If these three factors are held constant, we get 2 x 2 x 3 = 12 homogenous groups, with respect to which the equality or otherwise of the group means of the distribution of the scores in the intervening and dependent variables are feasible. The twelve homogenous groups arise from

Two sexes – male and female

Two locations of schools, urban and rural, and

Three age-grades, Grades I, II and V.

Again, within each of these 12 groups, the extent and nature of co-variation between pairs of variables chosen from both of the sets, intervening and dependent, can be studied, in terms of formulated hypotheses.

Again, for certain purposes, holding one of the three basic background factors constant, the remaining two factors may be collapsed, singly or jointly : for example, by retaining the sex variable, both locations urban and rural can be collapsed, with or without retaining the trichotomy between the three age-grades. Likewise, within each of the three grades, the dichotomy of location, urban and location,

can be collapsed with or without retaining the dichotomy between the two sexes. And so on. Many new types of groupings can be formed in this way. Significance of differences between group means, and of correlations between variables within the same grades can be studied. Detailed and exhaustive examples of formation of such groups will be provided in appropriate sections of the report.

The line of argument with the basic background variables of the first level, viz., sex, age-grade and school location, may also be extended and applied to the variables of the next level, such as those related to parental characteristics, and quality of schooling. There are a number of components of the variables comprizing parental characteristics which are known to exercise certain influences in complicated ways upon children's growth and development; the same is true of the variability among the schools, in terms of such factors as teacher-pupil ratio, teacher qualification, and school equipment and facilities. The way the variability of these two classes of influences - one from the home and parents and one from the school, can be studied within each of the homogenous groups, defined above, in which, all the three central factors sex, location and age-grade are held constant, or in which one, or two factors are held constant, and the remaining two or one is allowed to vary. The number of combinations of these two subgroups of variables becomes very large, and stating of all types of hypotheses, in relation to groups of varying degree of non-homogenity, soon assumes formidable proportions.

The above discussion throws some light on the complicated nature of the frames that are possible to be used, for forming groups of varying homogenity, with regard to all the independent variables. But once the groups have been composed, means become comparable by a appropriate statistical techniques. These means refer to scores made by the subjects in all the variables that belong to the intervening as well as the dependent category. The directionality of the trends of the group means for certain variables can be stated with some certainty - but for other they cannot be stated with such certainty; specific instances of these two types of hypotheses will be presented below.

So far, those analyses that are related to the comparison of the various types of group means of scores made in two classes of variables - intervening and dependent, have been discussed. The same line of argument can next be extended to certain hypothesis regarding the postulated inter-relationship or concomitant variations between the same pairs or sets of variables. The groups may be made smaller and homogenous, by controlling one or more of the independent variables, and then the correlation measures obtained by appropriate statistical techniques. The

directionality and strength of the measures of correlation between pairs or sets of variables may also be postulated in the hypotheses framed, depending upon our previous knowledge about such inter-relationship. Some instances of hypotheses, in which directionality and strength may be stated with some certainty, and some where this can not be done, will be shown below.

Powerful multivariate methods of statistics will also be explored, for the purpose of prediction of school performance, and performance in the Mosaic Test, on the basis of scores made in the intervening variables, and position of the subject with regard to the independent, background characteristics. The hypothesis testing will be only incidental - the major purpose is to obtain accuracy and prediction of future performance in the light of available knowledge about the child's performance in other tests, and his position in term of family and school environmental factors.

Some examples of Hypotheses to be Tested

A. Let us first take those groups which are homogenous with regard to sex, age-grade and location of school. We can then test the following types of hypotheses :

1.(a) Pupils from schools having better facilities (low teacher-pupil ratio, high teacher-qualification, and high school equipment level) will make significantly higher scores on the language test, on the Arithmetic test, and on the several scores desired from the Mosaic test.

(b) Children from urban schools will score significantly better than those from the rural schools, if over all quality of schooling is controlled.

(c) There will be a curvilinear relationship between 'size' of a school and performance scores in the 3 dependent variables - pupils from middle sized schools scoring the highest.

(d) Single-sexed and co-educational schools, and private unaided schools compared to aided schools, will not significantly differ from one another, when other factors are controlled.

2.(a) Children of higher castes, will make significantly higher scores in the three tests under the dependent variables category, than children of lower castes.

(b) The same type of trend will be seen between (i) children of parents who are more educated, than those who are less educated; (ii) children of parents who occupy higher echelons in the job hierarchy, than those who occupy posts in the lower echelons; and children of parents with higher income than those of parents with lower income.

3. The hypotheses stated under 2) can be stated either separately for father's education, job position and income and the same for mother's; as well jointly for both the parents.

4. Again, where both mother's and father's position, with regard to education, job level and income are high, their children will show the trends more strongly, where only one of the parents is high on the three socio-economic status factors.

5. If some form of over-all SES score is evolved along which all the families of the subjects can be unambiguously ordered or given a score, then children from families with high SES scores (or ranks) will score higher in the dependent variables, then children with lower SES scores.

6. A few hypotheses can be formulated with regard to influence of sex on performance :

(i) Female children will have significantly higher scores in the language test than male children. This will be more pronounced in the lowermost grade than in the upper-most grade tested.

(ii) The situation will be revised with regard to performance in the mathematics test - here the male children will score better - the trend becoming more pronounced in the higher grade.

(iii) There would be no sex difference in the Mosaic Test scores.

(iv) But in the Mosaic Test - some of the test scores at least, will show age-specific trends, - the older children scoring better in the Rating scales than younger children.

B. Next, let us illustrate some hypotheses concerning postulated relationships between the set of intervening variables and the set of 3 dependent variables. Here, however, since scores will be available in interval scales for all the variables, instead of testing significance of group means for high scorers and low scorers on each of the different intervening variables, determined by arbitrary cut-off points, it will be best to correlate among pairs of variables. The following are

examples of some of this type of hypotheses :

(i) There will be a positive correlation between moral relativism score on one hand and scores on the three dependent variables. The correlation will be low and positive.

(ii) There will be low positive correlations between sociometric test scores on one hand and scores in the three dependent variables on the other.

(iii) There will be a low positive correlation between social maturity score and scores on the three dependent variables.

(iv) There will be a moderately high positive correlation between mental age, and intelligence quotient, obtained from the Porteus Maze Test, and scores on the two achievement tests; but the value of the correlation will be only low positive with some of the IAIMT scores.

If these correlations are recomputed with more non-homogenous, larger groups, say across two sexes, or across two locations, and across the three age-grades, most probably the correlation values would become larger - due to the lifting of restriction on range.

C. Lastly, we can postulate certain relationships to exist between pairs of variables, one from the set of independent variables and the other from the set of intervening variables. Some examples of such hypotheses are stated below:

(i) Children from schools with greater facilities, like low teacher-pupil ratio, high teacher qualification, and high level of school equipments, will have significantly higher scores on the intervening variables, compared to those from schools with lesser facilities.

(ii) Children from smaller schools will have higher scores on the moral relativism scale than from medium or larger schools.

(iii) Rural school children will have higher moral relativism scores than urban children.

(iv) Girls will tend to score higher on the moral relativism scale than boys. This trend will become more pronounced in the upper-most age-grade, viz., Grade V.

(v) The constituents of socio-economic status, viz., parent's education, parent's income, parent's job level, and caste will tend to correlate zero with moral relativism score and social maturity age.

(vi) The constituents of the socio-economic status will have moderate positive correlation with intelligence and socio-metric status score.

(vii) The over-all SES score will correlate positively with all the tests tapping the intervening variables.

Instead of confining the computation of these correlations within small homogenous groups, if they can be computed for larger groups with basic background variables collapsed, like combining the two sexes, or two locations or the three age-grades.

Before we close this section on hypothesis testing, it may be pointed that the effect of certain background factors, like sex, or residence in urban or rural areas, on most of the intervening variables and the IAIMT of the dependent variable set, is not fully determinate. Therefore, the hypotheses relating sex with the remaining variables should be stated in the form of null hypotheses, rather than directional hypotheses. With the basic background factor of age-grade, the situation is different. Mental age, social maturity and moral relativism are functions of age, but popularity as measured by the sociometric status index, is most probably not a function of age.

<u>Other Statistical Analyses</u>

Testing of hypotheses is only a part, although of crucial importance, of the entire scheme of statistical analysis that is proposed to be carried out. Multiple regression analysis will be resorted to for finding the best weighted combination of the variables that would predict achievement in school subjects best. For this purpose the correlation between the criteria (performance in the school subject-language and mathematics) and the predictor variables are to be taken into consideration, as well as the intercorrelation among all the predictor variables. Besides, their means and standard deviation will also be required. Then separate multiple regression equations can be computed for predicting each of the criterion variables, that is, performance in language, and in mathematics, and also certain scores in the IAIMT. Details of such computation will be discussed in the findings chapters, at appropriate places.

<u>Testing the true nature of the Intervening Variables</u>

So far as the general scheme of statistical analysis is concerned, all the variables of the Intervening category are best treated as dependent variables, so far as the conventional independent variables

are concerned; next, these very intervening variables are treated as independent variables when they are correlated with the conventional dependent variables. However, from the research point of view, and from the point of theory construction, it will be necessary to go into the true nature of the intervening class of variables with greater thoroughness. Several techniques are proposed to be used for exploring this area. One is the method of using partial correlations. The contribution made by intervening variables in determining the size of the correlation between one of the conventional independent variables, and one of the conventional dependent variables can be systematically studied by partialling out the correlation due to the intervening variables. Systematic decrement in the size of the correlation, as more and more of the effects of the intervening variables are partialled out, will bear out the mediating nature of these variables. The other technique is that of 'critical path analysis' which also rests upon partialling out technique. At the appropriate place details will be discussed.

Chapter 5

BRIEF SURVEY OF LITERATURE

Before we start describing the present study, the way it was carried out, and its findings, it may be desirable to consider some areas that are relevant to the subject matter that has been proposed to be investigated here, in such depth and with such detail. This part of the study which is always found in reports of this type, has a ready-made title: 'Review of relevant literature.' Considering the great depth and extensiveness of coverage, in terms of the nature and number of variables under study, it is not possible to make a comprehensive coverage of all that is relevant. This review has to be brief., succinct, and selective: necessarily limited to the major variables under study and to the more salient findings. To try to go into the detailed ramifications of the interrelationship between the three classes of variables conceptualized here will amount to undertaking another study by itself. Hence, a brief and selective review will be presented here, of the most relevant findings related to the subject matter. However, first we have to look into how this review can be prepared.

Organization of Review Literature. In the present study, there are three classes of variables: Independent, Intervening and Dependent. The position of the variables under the 'intervening' category is somewhat ambiguous in the sense that depending upon the scheme of analysis they may be treated as dependent variables with regard to the independent variables; in another type of analysis, they may be treated as if they are the independent variables with regard to the dependent variables. A third approach is also possible, in which the hypothesized intervening or mediating nature of these variables are established with some degree of certainty. Critical path analysis is one such approach. There is no such uncertainty with regard to the dependent variables, which, in this study, happen to be performances in certain tests of achievement in school subjects, and in one semi-projective situation.

A. We can scan quickly through the list of the independent variables to see how these have been found to be related to the dependent variables, on one hand, and the

intervening variables, on the other.

B. This is repeated by scanning through the list of intervening variables to see how these are related to the dependent variables.

C. Lastly, the list of dependent variables should also be scanned, to ensure that anything relevant is not left out. Care has to be taken that complexities and redundancies are reduced in the coverage, if not eliminated altogether. This can be attempted by introducing a method of directionality while relating one variable to another. This is illustrated in Table 5-1, in which a matrix of all variables under study are shown. This matrix is not symmetrical: there the independent variables are shown as rows, and the intervening and dependent variables are shown as columns. Now, if scanning is done along rows, then the type of coverage that we seek can be accomplished. Again, some scanning along specific columns can also be done, to make the coverage comprehensive. The inter-sections amongst rows and columns indicate existence of some relationship between pairs of variables. The value of such a matrix presentation of relationships is largely heuristic, and helps in placing the findings in their proper perspective. It may be pointed out, that this scheme is only indicative: there is no intention to follow it strictly and exhaustively. It provides a framework for covering the literature systematically and economically. If pushed to the extreme, any attempt to be exhaustive will necessarily make such coverage repetitious and redundant.

Table 5-1

Matrix representation of relationships between pairs of variables

Variables	Intelligence	Social Maturity	Moral Relativism	Popularity	Hindi Ach.	Maths Ach.	IALMT Objective features.	IALMT Subjective features
1. Location	x	x	x	x	x	x	x	x
2. Sex	x	x	x	x	x	x	x	x
3. Age-Grade	x	x	x	x	x	x	x	x
4. Parent's Education	x	x	x	x	x	x	x	x
5. Parent's Job Level	x	x	x	x	x	x	x	x
6. Parent's Income	x	x	x	x	x	x	x	x
7. Caste	x	x	x	x	x	x	x	x
8. Religion	x	x	x	x	x	x	x	x
9. School Management	x	x	x	x	x	x	x	x
10. School Size	x	x	x	x	x	x	x	x
11. Uni-sex or Coeducation	x	x	x	x	x	x	x	x
12. Aided or Private	x	x	x	x	x	x	x	x
13. Teacher Qualification	x	x	x	x	x	x	x	x
14. Teacher-Pupil Ratio	x	x	x	x	x	x	x	x
15. School Facilities	x	x	x	x	x	x	x	x
16. Intelligence					x	x	x	x
17. Social Mat.					x	x	x	x
18. Moral Relat.					x	x	x	x
19. Popularity					x	x	x	x

Social-Cultural and Environmental Impact on Child Development

Children for this study are drawn either from rural or urban areas. The environmental factors obtaining in the urban areas in contrast with those operating in rural areas, and also the cultural stimulation obtainable in these two types of locations appear to have considerable influence in the developmental processes of the child--though the nature of the influence is not simple, but fairly complicated. The differential impact of rural and urban upbringing on child development has been studied under rural sociology and cultural anthropology. We can cover some relavant matter quickly by looking into an excellent summary provided by Sprott (1966).

According to Sprott, "there seems to be very little evidence that people from different societies have different degrees of sensory acuity." (Sprott, 1966, p. 133). Sprott mentions some research evidence;

> "At the turn of the century, Rivers, McDougall, and Myers took part in anthropological expedition to the Torres Straits, and through it they took every opportunity that offered to test the simpler peoples by laboratory methods. The same procedure has been used by other psychologists and all with the same result. With such tests the performance of one ethnic group differs but little from that of others, with the sole exception of colour discrimination. Even here it is not always easy to infer from the test situation to real life." (Sprott, ibid., p. 133).

Again Sprott points out that 'every animal selects stimuli for attention on a basis of its biological needs, as promises of satisfactions. This will mean that children coming from different cultures will give different structural emphasis to the world they see around them." (Sprott, ibid., p. 133).

An early study by Ansbacher (1937) showed that postage stamps of higher value 'looked' larger than ones of lower value, just as Bruner and Goodman (1947) found that coins appeared to be larger than cardboard disks of the same size. But more intriguing was the finding that children from poor homes made greater errors of over-estimation than those from more affluent homes. These are good examples of socially determined norms influencing perception.

Somewhat similar mechanisms may be operating in explaining differential memory as influenced by social-cultural factors. Recall of past events have been found to be bound up with cultural factors. Again mode of expression of emotions is also largely culture-bound, not only in defining what situations are appropriate, but also for what types, what magnitudes of expression will be proper. Each culture lays down norms of expression of emotions, of inhibiting them, and of reacting to expression of emotions on the part of others.

Intelligence is an integrating concept par <u>excellence</u>, and it has occupied the core of the age-old nature-nurture controversy. There appears to be a formidable amount of evidence about the functional nature of intelligence, irrespective of whether one accepts the postulated existence of a general 'g' factor, and many specific 's' factors, following the Spearman model, or the existence of multiple factors on Thurstonian lines. The position that intelligence is a composite of several factors or conceptualized abilities or dispositions along several dimensions appears to be incontrovertible. Whether one or the other factors of intelligence are influenced by social-cultural environmental stimulations is not an easy question to answer, but such a possibility has received implicit acceptance in the framing of culture-fair and culture-free tests of intelligence.

Earlier testing history is replete with findings purporting rural children being poorer in intelligence, as a group, than town children. Some of the gap in the intelligence levels was undoubtedly due to the testing instruments being loaded in favour of the urban children, in terms of content, and task requirement. The same type of trends has been seen in terms of varying social classes, as well as different ethnic groups. Equivalence of scales for testing intelligence has to ensure equivalence of informational content as well as equivalence of attitudinal disposition of subjects whose intelligence is being measured.

Again, intelligence, the way it is measured, is a measure of xx xxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxx the capacity to carry out a task, the capacity itself being a product of experience built upon an initial equipment. Sprott has

summarized the position very well:

> "We may say that innate ability must be there, and it must have experience, for it to manifest itself, but can we tell whether the experiences with which it has been presented have allowed to develop to its fullest capacity?" (Sprott, ibid., p. 141).

The evidence for the genetic determination of intelligence, at least a major part of it, is quite convincing:

1. Results from twin studies are quite fascinating. For example, IQ's of identical twins correlate .90 to .86, but the correlation is reduced to .70 for fraternal twins, and dwindles to .50 for siblings. The correlation between IQ's of parents and children goes down to about .30.

2. Results of studies of children reared in orphanages and foster homes also point towards higher correlation of IQ's among siblings, than among foster brothers and sisters.

For the present study the findings of the now classic research by Otto Klineberg (1935a, 1935b, 1940) are very relevant, which first seriously challenged theories of racial superiority of intelligence. Klineberg has shown that whereas Negroes in general score lower than whites in the U.S.A., Negroes, who have had experience of residence in cities for some time have higher IQs than those who have been confined to the rural areas. It has been postulated that there is a selection factor operative here-- the more intelligent Negroes also possess more initiative and they tend to migrate to the cities to better their position. But failure to find systematic differences between rural and urban children in general in IQ of the same ethnic stock, is another unclear finding. In this connection Klineberg's findings that city boys of Paris, Rome and Berlin had higher IQ's than their counterparts in the country also tend to bolster the theory that environment contributes to the level of functioning of intelligence.

In this connection the pioneering work done in this area by the group consisting of H.H. Newman (1937, 1940), F.N. Freeman (1938), K. J. Holzinger and B.C. Mitchell should be briefly mentioned. For example Freeman, Holzinger and Mitchell found IQ's of 401 foster children, some of whom were placed in

better homes, and some in poorer homes. When 74 of the children were retested, after being in foster homes for four years, those who were in better homes registered an increase of 5.3 IQ points, compared to only 0.1 points by those placed in poorer homes. The authors opined that "maximal effect of the best home environment raises the IQ 20 points".

It was also found that the occupational status of the foster fathers correlated very highly with the IQs of their foster children. The correlation between 'quality of foster home' and IQ of the foster children appears to be quite considerable-- .42 reported by Burks (1928), and .48 reported by Freeman et.al (1928). A study of a slightly later period by Lawrence (1931) done in London is quite interesting. She found that groups of children, removed from their parents before they had attained the age of one year, still systematically varied in IQ as a function of the occupational status of their parents. But what is more significant was the finding that this systematic trend became more pronounced with groups of children who had been removed from their parents not before the attaining the age of 3 years. Even this short duration of contact with parents during the early formative years of the children was a determining factor, so far as intelligence was concerned. Numerous studies done in western countries confirm that there is a positive but low correlation between occupational status of parents and IQ of children. In all such studies, the question still remains unanswered: How much is contributed by the environmental enrichment of good homes, and how much by social mobility factors? The latter would tend to push the more intelligent parents to rise higher in the social-economic hierarchy, whose children are found to be brighter. How much of this brightness may be due to inherited factors, and how much due to environmental stimulation?

Again, the small but definite negative correlation between family size and intelligence of children has invoked dual explanation: greater attention and care enjoyed by children in small families accelerating intelligence versus the more intelligent parents being more successful in keeping their family size. Sprott sums up the position thus:

> "From all the conflicting evidence it is obvious that no clear conclusion can be drawn as to the effect of social environment on intellectual ability.... We know that environment influences test performance, we know nothing about innate

> intellectual equipment. This means that we must first try to explain intellectual difference in terms of environment (save in case of pathological defect), and, only when this fails, have recourse to the 'residual category' of innate endowment." (Sprott, ibid., p. 148).

Sprott has pointed out that "if a certain method of child care is fairly uniform in society one may expect it to have its repercussions in the sort of persons regarded as 'natural' or 'normal' in the society" (ibid. p. 160). In other words, "there is a certain psychological coherence in culture-patterns." (ibid. p. 150).

Sprott therefore concludes that all those differences between children which cannot be attributed to social environmental factors must be assumed to have existed there from the start, that is, are genetically determined. He puts it thus:

> "What we actually have is people behaving overtly and covertly (i.e., in ways for which we use body language and in ways for which we use mind language). We are interested in such ranges of actual behaviou as are culturally acceptable. This behaviour is centered around certain positions in the society. There is appropriate behaviour for children, for adult men, and for adult women" and so on. (Ibid., p. 153).

These positions have been called 'statuses', and conduct appropriate to each status is called 'role'. Further categories like 'achieved status' and 'ascribed status' are distinguished. The latter are acquired through competition and individual effort. In a society with class differences these will define the ascribed statuses and may determine to a large extent the accountability to statuses which are achiev In this connection Sprott observes:

> "There is a need for what may be called social recognition. This may be derived from the association of the attentiveness of other people with the release of primary tensions--it is an important educational lever" (Ibid., p. 158).

Sprott then traces the concept back to certain primary tensions and their release systems together with the need for social recognitions, and accounts for its specific character by means of the principle of learning, plus the mechanisms which are brought into action under circumstances of disreward, or introduce some other dynamic principle, as 'moral sense'. A man is philanthropic; is it due to his happy home life, which has made his family dispose to other people, or his unhappy home life, which has engende

such hatred that he has to compensate it with exaggerated solicitude? Or can we account for it by introducing the concept of 'moral sense' or 'moral awareness'?

Coming back to rural-urban cultural differences, Statt's (1954) study can be referred to, which revealed distinct differences in the personality of children belonging to different sub-cultures. A few other studies have shown that the intelligence quotient of the children and the socio-economic status of the parents are inter-related. Investigations by Havighurst (1952), Alberle and Nagale (1952) and Bossard (1954) provide support to the view that the performance level of children is complicated by a variety of factors: for example lower class children are punished more and treated with more consistency than upper class children. In Hartshorne's and May's (1928) classic study on character, consisting of numerous tests of deception, of service and co-operation, of persistence and self-control, and of moral knowledge, the findings were not only unclear but mostly negative. In all but one of eight deception tests, a larger proportion of girls than boys succumbed to temptation. In the other tests also no clearcut superiority of girls over boys emerged. It would seem that perhaps females get credit for more moral superiority than they actually possess. The character test data in general indicate that although sex differences vary according to the specific situation a test involves, there is a tendency for boys to cheat less than girls, and for girls to exceed boys in tests of self-control, persistence, co-operation, moral knowledge and moral opinions.

Variability of Functions: Impact of Sex Differences, School Organization and Instructional Factors

Once we enter the school, what faces us squarely in the face is the variability among the pupils-- along a multiplicity of dimensions. Within the classroom, the extent of variability in terms of mental age is quite considerable. For example it has been found that, as pointed out by Tyler(1956)-- on whose work the next section depends heavily-- that the range of mental ages can be five years at the primary level, which goes still higher at the higher grades, reaching nine years at the secondary level. According to Tyler:

> " The dullest child in a sixth-grade class may be functioning at the level of an average nine-year-old, the brightest at the level of the average fifteen-year-old." (Tyler, 1956, p. 86).

Again, the correlation of general intelligence with school achievement has been found to be quite consistent over the whole range of situations-- ranging from .4 to .6 - which can be considered to be moderately high according to Tyler.

While it is true that some school subjects correlate higher with intelligence than others, but there is an impressive evidence of this general consistency of the correlations from first grade through graduate level, pointing towards the operation of some general intellectual factor related to success in school subjects. According to Tyler correlations reported between group tests (more dependent on reading skills than individual tests) and standardized measures of school achievement often run as high as .8.

However, there are bound to be variations: within any group made up of individuals who have had equal educational opportunities, whether it be a group of first-graders or a group of graduate students-- there are marked individual differences in both variables-- measured achievement and measured intelligence. Equal education does not tend to eradicate these differences. Thus the test score would seem to reflect something more basic than the influences of schooling. We may conclude that tests measure basic educational aptitude. Intelligence tests show consistent, dependable relationships to occupational levels as well as educational levels.

Ball (1938) determined the rating on one of these standardized occupational level scales for each of 219 men who had taken a group test of intelligence as children in 1918; this test itself was administered in 1937. Some of the subjects were administered the intelligence test in 1923 and not in 1918. For the 1923 test group, the correlation between scores and occupational level turned out to be .57; but it was .71 for the 1918 test group.

What can be said about the traits represented by the combinations of items that have been sorted out by contrasting good students with poor ones? According to one author, Gough, the following characteristics are primarily involved:

1. Acceptance of conventions, rejection of the frivolous and diversionism; orderliness, planfulness, and basic seriousness of purpose.
2. Personal efficiency, vitality and integration.
3. Sense of academic effectiveness, good study habits, sense of accomplishment. (Summarized from Tyler, 1956, p. 126).

Next we may like to look into sex differences in school performance. We will summarize the position as reported by Terman and Tyler (1954).

<u>General Statements.</u>

1. If there is a difference between the sexes in general intelligence, it cannot be identified by means of our present tests, since some types of problems seem to favour males, others favour females, and there is no satisfactory way to decide which ones constitute valid indicators of general intelligence.

2. Girls tend to excel on verbal types of problems, boys on quantification or spatial.

3. School marks almost universally indicate superior achievement for girls, whereas achievement tests show girls to be superior in all kinds of language material, boys in science and mathematics.

Carefully conducted surveys of the administration of the Stanford-Binet tests to boys and girls in the thirties and forties failed to show any significant sex difference. It supports the conclusion that the direction and magnitude of sex differences in intelligence depends on what test is used. This lack of difference between the sexes holds for numerous studies with non-verbal intelligence tests.

Hobson (1947) carried out a study in which the subjects were students of several fairly large groups of eighth- and ninth-graders. He found that the girls made quite high scores on W (word fluency), R (reasoning), and M (rote memory), whereas boys scored highly on S (space), and V (verbal meanings). Havighurst and Breese (1947) who tested all 13-year olds in a typical mid-western community, found that girls excelled on N (number), W (word fluency), R (reasoning) and M (rote memory). The boys scored higher on S (space). They found no sex difference on the factor V (verbal reasoning). It is interesting to note that neither study showed marked superiority of boys on the factor N (number) which we may expect on the basis of the trend in school achievement tests made by the two sexes. Further, the well substantiated superiority of girls would seem to be one of fluency rather than of meanings and concepts.

Smith (1948) who administered nine paper-and-pencil tests of spatial ability to 100 boys and girls ranging from 12.5 to 14.5 years, obtained a significant sex difference, while there was none in intelligence tests.

Emmett (1949) has reanalysed data from several large scale studies to show that there is a special spatial ability that can be identified by the age of 11, and that boys are clearly superior to girls in tests in which it is involved.

Achievement in Language Areas. Most studies based in school achievement tests have shown girls to be superior in tasks involving use of language. School surveys, using reading tests, show higher scores for girls. On the other hand, a number of school surveys have not shown any tendency toward consistent female superiority. Results on the Thorndike-McCall reading has been reported by Thorndike et al (1934) for 266 boys and girls aged 13 to 15 years, and for 785 boys and girls in eighth grade of New York city public schools. In the first of these groups there was a reliable difference favouring girls; in the second a reliable difference favouring boys. In a large scale study carried out in Australia by McIntyre and Ward (1935) in which the sample size was 30,000, tests of vocabulary, speed of reading, reading for general meaning, reading of details, and reading for inference were used. Only in speed of reading, were there consistent and reliable sex differences favouring girls. Even in very young children there would seem to be a sex difference in what might be called verbal fluency. Some studies indicate a slight but consistent superiority of girls in articulation, intelligibility and correct identification of vowel sounds.

Achievement in Arithmetic. In general there appears to be a slight but consistent male superiority in arithmetical reasoning, and either no difference or female superiority in simple computations. The lower the age group tested, the less significant is the difference.

In Burt's classic study (1921) sex comparisons were made in seven phases of arithmetic achievement for about 250 pupils of each sex at each age level, from 8 to 12 years. In oral arithmetic, boys were reliably superior to girls at every age. In 'mechanical' aptitude, the differences were unreliable except at age 12, where they favoured boys. In arithmetic

problems the differences were reliably in favour of boys at all ages and were particularly large at ages 11 and 12 years. Schiller's (1931) data for 189 boys and 206 girls in grades II and IV showed no appreciable sex difference in computation, but in arithmetic reasoning boys were found to be reliably superior.

At the primary and preschool levels, the differences are neither consistent nor statistically significant--sometimes favouring boys, sometimes favouring girls. Woody (1931) gave an individual inventory test in arithmetic consisting of 205 items to about 100 children in kindergarten, 600 in Grade IB, and 180 in Grade IA, and 300 in Grades IIA and IIB. Boys were superior in all comparisons, but in no case was the difference statistically significant.

From the above studies it seems that in arithmetic achievement the sex differences are small at the lower levels represented by routine computations and they progressively favour boys as these are found to consist of more complex levels of arithmetical reasoning. In the work reported by Blackwell (1940) there is an interesting suggestion, that the mental processes by means of which arithmetical problems are solved become differentiated in boys and girls as a function of progressive development. He made a factor analysis based on a battery of mathematics tests given to 100 boys and 100 girls aged between 13½ to 15 years. The first two factors that emerged were alike for the two sexes, the well known 'g' and a factor called 'o' representing the carrying out of mathematical operations. The third factor 'v' seemed to be more specifically verbal in girls and more like verbal reasoning in boys. A fourth factor was identified for girls but not for boys, a factor which seemed to represent precision or exactness.

<u>Variability in Performance</u>. McNemar and Terman (1936) made an extensive survey of the most reliable and objective data available on variability of the sexes in physical traits, scholastic achievement and intelligence. The results for achievement are far from consistent, but on the whole indicate a slight but consistent evidence favouring greater male variability. On the whole the evidence seems to favour only a slightly greater variability in intelligence among boys.

Social And Moral Development

Development of social maturity and moral attitudes have to be studied within the larger framework of social development, in which the home, the family, the neighbourhood, and the school exert lasting impact.

Social maturity is a concept which connotes some sort of normative behaviour even though it may not be spelled out in detail and exert terms. However, there is a strong implication of age-specific variability in the concept of social maturity: certain behaviours are considered to be appropriate only when the child has attained a particular age. The concept of social maturity is found to involve certain aspects of social development, as security, handling of anxiety, dominance vs. submission, leadership, competition, etc. Kimball (1953) found that a child with low concept of self, low self-esteem, feelings of inferiority, strong needs of dependency and a lack of personal security necessary to permit a manipulation of the environment prevented the child to achieve. Feelings of dependency and inferiority prevent an individual from realizing his potential.

Concklin (1940) and Walsh (1956) have implied that under achievers have a history of disturbed personal relations, especially with respect to their family. In a longitudinal study by Haggard (1957) high achievers, in contrast to low achievers, tended to be more responsive to the socialization pressures of their parents; they accepted parental values and expectations. By and large the high achievers were aggressive, competitive and persistent.

Rao (1964) found that academic over achievement and under achievement are related to general adjustment. In another study Rao found a relationship between academic achievement and sense of responsibility, that over achievers show a stronger sense of responsibility, and more curiously, in academic pursuits than under achievers.

Social Attitudes and Behaviour

A number of researches suggests that the female shows more sociability in the sense of social desire, but that introvertive tendencies and inferiority feelings often inhibit her social participation.

Butler's study (1934) of 1600 subjects in grades VIII to XII shows that girls greatly exceed boys with regard to knowledge of matters having to do with family relationship and social adjustments. Barnes (1930) using a rating scale technique with 82 nursery school children found that girls show more responsibility for others, more social conformance and made more motherly behaviours than do boys. Wellman (1926) made observations of the free groupings of 27 boys and 27 girls in a high school population of 113. She found that boys at this age seek a much wider range of companions than do girls. The mean number of companions for the boys was 22.2 as compared to 16.5 for girls. Campbell (1939) also showed by means of a modified 'guess-who' technique that boys' social relations are less rigidly structured than those of girls.

A series of sociometric studies by Bonney (1942a, 1942b, 1944) have been concerned with popularity and social acceptance among II, III and IV grade children. Girls seemed to outrank boys consistently in social success. They are chosen more frequently in the various choosing situations and get higher scores for mutuality of friendship.

Challman (1932) recorded 7248 social groupings among 17 boys and 16 girls attending nursery schools. Girls showed a trend toward more social participation and higher friendship scores than boys.

Summary. Girls appear to have the advantage in breadth of social contacts at the pre-school and primary grades level that they lose to boys by the time adolescence is reached.

Character and Reputation

It is traditionally believed that females are superior to males in various moral qualities. But empirical support for this popular feeling is not very strong. Certain methodological complications make the collection of reliable evidence difficult. The overall position has been excellently summarized by Vernon Jones (1954) thus:

" In any strict interpretation of character it is clear that it is not co-extensive with ethical and moral behaviour. Morality concerns itself with conformity to existing standards of a given time or place. Character

does not imply such conformity... Conformity to existing standards sometimes demonstrates not so much character as behaviour along line of least resistance.. This does not mean that character is not related to morality. It means that character is a more dynamic and more inclusive concept. If we add to morality the ability to reconstruct one's values and the volitional powers sufficient to direct one's conduct progressively toward more enduring values, then we have character. The objective of character development is the growth of the individual toward higher personal and social values and toward conduct consistent with them" (Vernon Jones, 1954, p.781-783).

Moral Development.

According to Sprott (1954) "psychologists often ignore moral problems altogether and assume that because a very large range of human conduct can be explained with the simple scheme... moral decisions will prove equally amenable. (Ibid, 159-160). He adds "Some coherent emotional treatment is a pre-requisite for the development of responsiveness, leaving aside the native-aggressive or otherwise-- of the responses. (Ibid, p. 160).

The most original work on this subject has been done by Jean Piaget, who traces a sense of moral responsibility to the development of children's relations with one another. Drawing on data of plays of Swiss children, he concludes that the attitudes towards the values seem to change as the child grows out of its readiness to accept them as sacrosanct, and reaches a stage at which the rules are regarded as necessary convenience for the playing of the game, but alterable and 'breakable', if it would on occasion be 'fair' to do so. The notion of 'fair' presupposes an appreciation of another persons' position. It may be learnt within the family circle, and it is sharpened in a group of children fending for itself, and yet learning that regard must be paid to the interests of others if one's own interests are to be regarded. (Sprott, 1954, ibid. 161-162).

The whole position has been summarized by Sprott thus:

"As the infant grows up, it becomes 'socialized', by acquiring a set canons which aim at preventing its doing what the adults and its contemporaries dislike. It may learn that

such conduct is dangerous, or ridiculous, or wicked. The stress varies from culture to culture, and within any large scale culture, from one sub-culture to another. Some rely on danger, all use ridicule to some extent, and some use both, and 'sin' in addition. Cultures also vary in the content of the forbidden, though all conduct which prejudices social living is likely to be banned by all societies. Furthermore, when a plurality of disciplinary techniques are employed, some conduct are controlled by fears, some by ridicule, and some by 'guilt'.... Whatever be the technique adopted by a society the majority of its members will acquire its restraints and seek after the rewards it provides for doing what it encourages and not doing what it penalizes. General forms of behaviour which are acceptable or the reverse will vary, but all socialization involves some measure of renunciation... As we grow older our 'frustation tolerance' improves. It is significant that in experimental situations younger children and neurotics, who may be assumed to have high aggressive tension, stand frustration less well than older children and non-neurotics. Indeed, maturity positively is an increased capacity to stand frustration." (Sprott, ibid., 175-183).

Impact of School Conditions

Before we end this section we can have a brief overview of those factors which are specially related to schools which we know or assume to exercise certain influence upon the psychological development of the children undergoing training in them.

It is generally accepted that school variables play a significant role in the scholastic achievement of the children.

Wilson (1958) compared the achievement of Grade III pupils in two different cities. The schools in the two cities did not differ on the amount of time devoted to reading, spelling, or arithmetic. The pupils examined were of comparable general ability. In administrative advantages, however, the cities differed considerably. In one city all children had the benefit of kindergarten education; classes averaged in size below 30; and all teachers had four years of training qualification. In the other city no children had kindergarten education; average size of the class was 38, and the teachers had

only two years of training qualification. Comparison, however showed no advantage of city A over city B, in arithmetic, spelling and reading. In fact any difference that appeared regularly favoured City B, which is quite a paradoxical result. Peters and Van Voorhis (1940), Stephen (1955), Stephen and Barton (1945) all report results which show that achievement is not affected by school variables like size of class, reputation of school, or of time given to instruction, or of administration and organization of the school.

The bulk of the research evidence with regard to attendance and achievement is not conclusive and tends to refute the common assumption that absence results in hurtful effect upon scholarship as reflected in school marks (Stephen, 1967).

When intelligence is held constant, the correlation between attendance and personality development varies between .10 and .20. Fleming (1959) Powell (1961), Marklund (1963) have obtained results the consensus of which seems to be that in the first few grades the size of the class is related to achievement of the pupils, but in the higher grades the size of the class is completely unrelated to the achievement of the pupils. However, Powell (1964) did find smaller class to be advantageous at the higher grades. Tiwari (1962), Mishra (1959) and Saran (1962) have reported studies dealing with causes of failure of pupils. They examined the organizational factors such as time table, workload of teachers, correlation with aids and appliances used, and class size etc. The results of these studies fall into expected pattern, and the authors make usual suggestions on such matters as reducing teacher-pupil ratio, improving school conditions, reducing the number of examinations held per week, etc. Again Pandey (1958) and Mishra (1957) have tried to relate the characteristics of the teacher with pupil achievement. The results are mostly negative.

Sociometric Status and Its Correlates

Sociometric technique has certain unique advantages not possessed by most other tests. It is accurate, easy to frame, easy to administer, least time consuming, and can be used with subjects varying in age from 3 or 4 years to 90 years and it is inexpensive. The results can be analysed at levels which may be very simple or at levels which utilize very advanced

mathematical or statistical techniques such as matrix algebra, graph theory, and factor analysis. That is why this technique has been used very extensively throughout the world.

The test is simplicity itself. An occasion is specified in which two or more persons can join together. The subject is asked to name the person or persons he would like to choose for this specified occasion. So sociometry essentially boils down to finding the preferences for friends or companions for associating on a specified occasion. The number of companions that can be selected is specified in advance. The selection of the friend is occasion-or task- specific, making true sociometric choices somewhat different from what has been called 'near sociometric' choices which also call for choices of friends in a generalized fashion, and not bound to any specific and defined situation.

There is a huge body of literature dealing with sociometry directly and exclusively. Besides, there are also innumerable studies in which sociometric techniques have been used as one of many variables under study. Too summarize all that will be too big a task, and not very germane. But some highlights that have some relevance for the present investigation will be mentioned below.

Gronlund (1959) has provided us with a good textbook for the users of sociometric techniques. Some of the more relevant findings have been summarized in this textbook. Extensive reviews of the sociometric techniques are to be found in Gardner Lindzey (1954, 1970). Two exhaustive articles by Blake et al (1954a, 1954b) deal exclusively with reliability and validity of sociometric tools. Lastly, there is important book "Sociometric Reader" edited by Moreno et al. (1960) which contains some of the more important articles and papers on the subject of sociometry, which are invaluable for all those who are interested in conducting research with this technique. For shorter summaries one may refer to Merl E. Bonney and Mary L. Northway (1960) who did some of the earliest work with sociometric techniques. They have dealt with the relationship between sociometric acceptance status on one hand and some psychological characteristics such as personality adjustment etc. on the other hand. Those who are interested to get acquainted with work on sociometry done in India may refer to Sharma (1970). The summary presented below draws upon all these studies.

Kuhlen and Bretsch (1960) found that those students who were claimed as 'unacceptable' on the sociometric test, were also characterized by such problems as lacking necessary social skills, not having close friend, having family conflicts and being unhappy in schools, as compare to well accepted students.

Feinberg (1953) found highly accepted subjects to be characterized by very favourable parental relationship, by unusually good school adjustments, by active participation in sports and social events, by the belief that they had many close friends. The reverse conditions held for rejected boys.

" When comparisons have been made between students' stated choices on a sociometric tool, and their observed social relationships, it has been found that the two are similar, but not identical. This is to be expected: the students with whom an individual student plays and those with whom he would like to play are very often quite different. The students whom he chooses may not want to play with him, or they may be involved in activities that do not or cannot include him. "(Sharma, 1970, 59-60).

Due to the fluidity and flexibility of human relationship, more so among very young children, choices expressed at the verbal level and actual association at the behavioural level would tend to correlate somewhat lower. This lowered correlation is not a reflection on the validity of the measuring tool, but rather on the nature of the choice process itself-- which is quite labile and sensitive.

Correlates of Sociometric Status

According to Sharma "there are a number of personal and social variables which influence sociometric responses and make people acceptable to one another. These variables include age, maturity, intelligence, language development, personal appearance, academic achievement, socio-economic status, positive personality traits, seniority, etc."(Sharma, 1970, p.).

Sharma investigated the relationship between intelligence, academic achievement, personality adjustment, interest pattern, life at home and life at school with popularity and isolation. His subjects were pupils of VIII grade in three

higher secondary schools-- one boys, one girls, and one co-educational. He found that the differences in the mean scores in Raven's Progressive Matrices test made by 27 populars and 21 isolates was 7.46 points (33.24 - 26.48); this difference was significant beyond .01 level. Earlier Heber (1956) had also found that the children with high intelligence score, on the average, were markedly higher in sociometric status than children of low intelligence.

With regard to achievement in school subjects, Sharma found that the mean achievement scores of isolates in all the three schools were lower than the mean achievement scores of populars and the differences reached significance at .01 level in the girls school and the co-educational school.

There is a finding attributed to Bonney and Smith who found that students who ranked high on the sociometric choice scale, tended to have high level of achievement than those who ranked low. However, Grossman and Wright had found that reading achievement which was below average was associated with low sociometric status, but that above average achievement did not show any association with sociometric status. Sharma points out (p.81) that the relationship between sociometric status and academic achievement is exponential rather than linear.

It is generally found that the populars are better adjusted than the isolates. For example Sharma found that in each of the five areas of adjustment, viz., home, health, social, emotional, and school, and on the whole, i.e., total personality adjustment, the populars tended to have the higher scores; this was true for emotional adjustment. But in school adjustment the populars had the lowest scores. Curiously enough, the isolates had their highest scores in health adjustment and lowest scores on home adjustment. However, the differences in scores between the isolates and populars failed to reach level of statistical significance. An earlier study by Flowtow had reported that the isolates had low home adjustment.

With regard to socio-economic status of populars and isolates Sharma makes certain interesting observations which are relevant, and are summarized below:

1. The medium monthly income of the parents of the populars is 1.75 times that of the parents of the isolates (Rs. 700 to Rs 400).

2. The fathers of populars had better education than those of the isolates.

3. Similar trends are shown by the educational levels of the mothers of the populars and isolates. For example, mothers of 23% of populars were graduates, while none of the isolates had mothers having education upto the degree level. Again, 15.4 per cent of the populars had illiterate mothers, against 40% isolates whose mothers were illiterate.

Mosaic Test and Its Correlates

Because the Lowenfeld Mosaic test is primarily a projective test, studies purporting to explore its relationship with psychological and educational processes other than personality are not very extensive. The fact of its being a projective test limits its scope considerably for its being used simultaneously with other objective and psychometric tests However, despite its being a projective test, it shares some of the qualities of the performance type of tests, so that some of the test results are quantifiable. Again, being a performan test, it does not depend upon the use of verbalizations or language. This non-linguistic character of the test endows it with certain advantages, which have been seized upon by a number of scholars for exploring its inter-relation with performances in other areas of behaviour. What is more, it is a test which can be used with subjects of all ages, who do not suffer from any form of psychomotor disability or perceptual defect.

The authoritative and original text on the Mosaic test is by Dr. Margaret Lowenfeld herself, the originator of the test. This has been published in 1954, entitled The Lowenfeld Mosaic Test. Any scholar intending use this test or do research work with this test can ill afford to ignore this outstanding text.

Apart from the textbook by Lowenfeld there are few books on this test, though chapters on this appear in many books on projective techniques such as Bell, Abt and Bollak, Anderson, etc. Of course, there is no dearth of research papers using this test. The lack of a good definitive research publication on the Mosaic test has been largely fulfilled by the appearance of the remarkable volume by Ames and Ilg (1962) which must be considered to be a landmark in the area. It

carries on from where Dr. Lowenfeld left off in 1954 in her classic text.

In India very little work has been done with this test. Perhaps all of it have been done by Chatterjee (1968) and his associates, The line of departure adopted by Chatterjee et al is the emphasis on the quantitative features of the mosaic performance which has been neglected in earlier approaches, Instead of trying to analyse the mosaic design produced by the subject using a purely projective frame of reference, the psychometric approach is used and some very striking regularities are seen. The following summary has been prepared drawing from the work of Lowenfeld, Ames and Ilg and Chatterjee et al.

The Nature of the Mosaic Test.

Lowenfeld (1954), describing the origin, nature and use of the Mosaic test has made certain observations about the approach of the test which is based upon the classical, projective framework:

" The approach to the study of personality is direct in that what is required from the subject is spontaneous and creative use of brightly colored material which is available in sufficient quantity to allow of unrestricted choice. The behaviour of the subject, the mode of construction of the resulting design, and his comments upon it etc form part of the total response. The design made by the subject together with his whole attitude to the test is then directly evaluated by the tester.. The test is capable, therefore, of providing correct information as to the stage of development or the degree of disturbance of perceptual powers in case of amentia, severe neurosis or cerebral disease." (Lowenfeld, 1954, p. 15-16).

Lowenfeld's approach for interpreting the designs has been to view the test as a projective device, pure and simple, so that the type of approach that is used in the present study is quite different from it. The types of psychological constructs and mechanisms that are invoked in interpreting Rorschach and TAT are also implicit in the approach advocated by Margaret Lowenfeld. Most research workers during the earlier days who have used the Mosaic test have tended to follow this subjective, projective approach, which essentially boils down to comparing one particular design with other designs regarded normatively

derived from distinct etiological groups. Of course these known groups can be formed on a variety of bases-- these may be etiological groups; these may be their groups; these groups may vary in age, culture, upbringing and a host of other defined characteristics. Even though normative groups may be used as the frame for reference and comparisons, but the process of comparison remains essentially qualitative-- so that the subjective judgment of the interpreter plays a major role in analyzing the design for drawing conclusions and making behavioural predictions. The concern here remains configural-- the qualitative features are scanned closely for the presence or absence of signs which are supposed to be shared in common by other known group or groups; alternatively certain features of the mosaic design may be hypothesized on a prior ground to be related to certain factors or mechanism; for example, colour response in Rorschach is associated with emotional processes.

Happily, in the definitive study by Ames and Ilg, the approach shows a judicious blend of the qualitative with the quantitative methods of analysis of the projective output. There is also some emphasis laid on the behavioural correlates of the mosaic performance, particularly so for these are capable of being pinned down to actual test taking behaviour of the subject while he is engaged in fabricating a design. For example Colm (1948) has observed that the mosaic test provides a great opportunity to observe in a quick and direct way the personality of the subject being expressed in a spontaneous fashion. Colm goes so far as to remark that " the Mosaic is often the only test which gives some clue as to the child's genuine intelligence.. a dynamic design made with the mosaic test gives greater indication of the child's genuine development." The difficulty comes in when we use such subjective concepts as 'dynamic'; what qualities are necessary to be present in a design to make it recognizable as 'dynamic' and not 'static' ?

Preliminary research aimed at setting up school readiness tests which will accurately predict school performance suggests that mosaic designs may possibly correlate better with other effective tests and with later school performance than does the Rorschach. Ames and Ilg are of the view that their researches suggest that the mosaic may also

be used in making the important distinction between developmental age (that is age at which an individual functions as a total organism) and intellectual age.

Lowenfeld herself appears to be of the view that a mere counting of the pieces, in fact, any such quantitative treatment of the mosaic data is not only useless but is undesirable, since proper evaluation of any product requires not so much counting, or matching to some previous standard, as immediate global evaluation by the examiner. This view is not only archaic, but in the light of the entire gamut of research concerned with clinical-versus-actual prediction and intuitive configural scoring of projective protocols, is totally untenable. However, as pointed out earlier, evaluation of mosaic designs by a combination of the qualitative and quantitative techniques has had some start quite for some time.

One important contribution in this area was made by Wideman, who tried to validate an objective scoring method applied to mosaic designs. Wideman (1953, 1955a, 1955b) developed 39 scoring categories for the mosaic test, and gave operational definitions to these scoring categories. The test was administered to 107 normal, 70 schizophrenic , 48 neurotic and 20 organic subjects. The scores obtained by the patient groups were compared with those of the normal group. It will be interesting to note, that out of the various scoring categories developed by Wideman, the following items have been included either under the subjective or the objective scoring of test protocols done in the present study. The point should be made here that the sharp differentiation that is made in the present study between subjective items and the objective items is not so clearly articulated by Wideman and most other researchers who have tried to follow this 'combined' approach. Further, even the subjective qualities of the mosaic designs in the present scoring system are 'rated' and there is no attempt to 'interpret' them or to look for meanings or implications in them, at least at the scoring stage, as we would do while looking at Rorschach or TAT responses. In short, the psychometric approach predominates even while scoring the subjective features of the mosaics.

Items of Wideman's Scoring Category Shared by the Scoring Techniques used in this study

Subjective Items	Objective Items
1. Colour symmetry	1. Location on tray
2. Colour patterning	2. Total number of pieces
3. Aesthetic quality	3. Time taken
4. Compactness	4. Multiplicity of designs
5. Concrete-abstract	
6. Completeness	
7. Complexity	

There is a general relation between increasing mental age and the complexity of pattern and excellence of design among mental defectives.

Some studies by Stewart et al (1955, 1957) are also interesting. In the first study there were 100 boys and girls who ranged in age from 5 years 8 months to 7 years 3 months. Their IQ ranged from 75 to 141. The main conclusion of the authors was:

"Within the normal group and after pre-school age, intelligence apparently played little part in the type of mosaic designs made. Children who made freer patterns which cover much or all of the tray but contain elements of good organization are apt to be made by adequately adjusted youngsters. The subjects who made miscellaneous objects were, on the whole, the brighter, the better adjusted children who seemed to have no need to project personality difficulties. Designs, whether symmetric or not, if made toward the center of the tray, usually indicated the better adjusted children, while those which clung to the edge seemed to by symptomatic of immaturity."

In the second study the subjects consisted of VIII grade children, numbering 125, whose ages varied between 11 years 3 months to 15 years. A greater tendency toward abstract design was found. 'Scenes' were almost entirely the production of the bright, adjusted boy or girl.

Two studies by Dorken (1953 and 1956) report somewhat divergent findings: "The relation between Mosaic test performance and measured intelligence is under considerable debate." According to the review made by this author some investigators have reported such relationship between intelligence and mosaic test performance, but other investigators have failed to confirm the same. In this connection the study by McCulloch and Girdner (1949) can be cited. They found a general relationship between increasing mental age and the complexity of the pattern and excellence of designs made by mental defectives. Another rather striking difference between the mosaics of the normal group and those of the defectives of the same level is concerned with colour arrangement. Mosaics of mentally defectives were inferior in colour harmony. As a check upon the apparent relationship between mental age and overall goodness of mosaics, an attempt was made to sort out mosaic designs into mental age groups and a correlation was obtained between this sorting and mental age. This was found to be .43, with sample size of 88. The mental age was ascertained through the Stanford Binet test.

In a study of mental defectives by Shotwell and Lawrence (1951), coherence and accuracy of the mosaic designs were found to be related to mental age of the subjects.

In the review by Dorkon it has been mentioned that Wertham (1950) on the basis of his study concluded that the mosaic test provided a measure of functional intelligence. This is confirmed by Wong (1950) at least at the level of young children. It has been suggested by Woolf and Gerson (1953) that mosaic designs would positively correlate more closely with performance tests of intelligence, and fairly strong evidence was found of a positive relationship between the revised Binet mental age and mental age estimated from the mosaic designs constructed by normal children and mentally defectives. On the other hand, Reeman (1950) found no relationship between the score on the Goodenough Draw-a-Man test and mosaic designs. Some authors are of the view that at levels of mental ability equivalent to a mental age of 8 years, and higher, no relationship will be observed between psychometric test results and success on the mosaic test. Authors like Diamond and Schmale, 1944, Reeman, 1950, and Stewart and Leland, 1955, are of this view. The finding of Flum (1954) belongs to the same category: there was no

correlation between mosaic design content and Wechsler-Bellevue IQ Eysenck and Eysenck (1947) had found no correspondence between aesthetic scores and the number of pieces used for constructing the mosaic design and intelligence in adults. Reviewing such findings, Dorken comes to the conclusion that the question of the mosaic test being a valid measure of functional intelligence among adults is still an open one, and is far from being definitely established; it appears to possess but minimal relationship with standard intelligence scores.

But the situation is quite different when the subjects are children. Here there is scattered but reasonable evidence that performance on the mosaic test bears a relationship with intelligence. Further, there is evidence that there is systematic change in performance with development of the child. As the mental age of the subject goes on increasing in step with chronological age, the quality of the mosaic design also shows systematic improvement. But as the mental age reaches its peak around 16 years of age, there is no further inter-dependence. Findings reported by such authors as Wertham (1950), Wong (1950), Woolf and Gerson (1953), Flum (1951/52), and Reeman (1950) are more or less along the same line.

Sex Difference.

Certain systematic differences have been noted in the mosaic designs constructed by boys and girls. Stewart and Leland (1952) found a tendency for boys to make correct designs more frequently than do girls. But this difference practically vanishes by the time adolescence is reached. However, on the basis of the review of literature, Dorken does not find much evidence for any definitive and systematic sex difference in the mosaic designs. He concludes: " Little in the way of sex difference has been reported, and these are apparently attributable to differing rate of maturation between the sexes during childhood.". In the earlier study of Diamond and Schmale also no difference between the sexes was observed, but the subjects were adults. Wideman (1955) found negligible difference between the sexes. Kerr has reported (1959) a lessening of sex difference as adolescence is reached. Reeman, cited earlier, found that there was a preponderance of abstract and scattered designs made by girls.

Boys frequently made designs which were concrete and articulated. The study by LaLonde (1954) is interesting: it was concluded that to attempt to delineate masculinity and feminity on the basis of mosaic designs was unsuccessful. None of the items studies were found to discriminate between the designs made by the two sexes. Stewart and Leland (1952) found a tendency for boys to make concrete designs more frequently than do girls-- but this tendency became progressively less as adolescence was approached. Walker's (1957) subjects were boys and girls of 6, 8 and 10 years of age. It was found that boys tended to make designs which were frequently of the representational type; but girls tended to make abstract designs.

In this connection it will be worth quoting the result of another type, related to developmental variation in the mosaic which will be highly relevant to the present study. Instead of dealing with qualitative features of the mosaic, we can try to find out how certain strictly quantitative features of the mosaic are related to maturational and developmental change. Ames and Ilg (1962) have reported the size of the mosaic design contructed by boys and girls of different age groups.The mean number of pieces used by boys and girls of different age groups was as follows:

Age (Years)	Mean No. of Pieces Used	
	Girls	Boys
5	10	49
6	16	19
7	6	36
	36	33
9	32	22
10	29	31
11	39	34
12	45	20

Systematic change is more related to maturation rather than sex, seems to be the ovarall trend in the above findings.

In this connection the finding of Chatterjee, and Sharma and Chatterjee cited earlier may also be referred to.

Chatterjee found that children from better schools tended to use on the average more pieces than the children of the more deprived types of schools. Sharma and Chatterjee noted that Muslim post-adolescent boys used on the average lesser number of pieces than a comparable group of Hindu boys. Certain colours were preferred by Hindus and certain other colours were by the Muslim subjects.

CHAPTER 6

OPERATIONAL DETAILS OF THE PRESENT STUDY: INSTRUMENTS

In Chapter 4 the entire plan of this study has been described, using the future tense -- because that is only a plan, purporting to be a projection into the future, a scheme which is proposed to be carried out, for which the necessary guide lines have been provided. The operational details of the study consist of descriptions of how the study was carried out in actuality. Thus taken together with the plan outlined in Chapter 4, material of this chapter represents a mapping process-- from one set, whose elements are the proposals,-- to another set, the elements of which are the actual operations or actions that have been carried out in fact.

This chapter will deal with the tools used in this study how these were selected or developed, and/or standardized and then made ready for use. The method of scoring each of the instruments used will also be described.

SELECTION OF INSTRUMENTS

Since the Varanasi centre was interested in studying the development of child's psychology in terms of the three-category variables model, it was decided to have an optimal number of intruments for tapping the postulated variables subsumed under each of the three categories of variables: indepenedent, intervening and dependent. The tools will also be described in that order.

A. Instruments for tapping Independent variables.

In this category the following two instruments were used:-

1. One composite schedule-cum-checkist for obtaining information about the school attended by the subjects included in the sample.

2. One composite instrument in the form of a schedule for collecting personal and family background information.

These two instruments are described in detail below.

1. The School Variables Schedule

This instrument has been developed by the Bangalore Center. Essentially, it consists of four parts, out of which one is meant for gathering certain required information about the working of the school, and the remaining three parts are in the form of scales for

measuring certain defined charactoristics of the school under study.

Originally the instrument covered 8 areas, as follows:

1. Shift system operating in the school
2. Sex composition of scholars: uni-sex or co-educational
3. Mode of handling student absentee-ism
4. Teacher's sex
5. Parent-teacher contact
6. Teacher's qualification
7. Teacher-pupil ratio
8. Facilties and equipments available

The last three items were in the form of scales. The first items were in the form of a pro-forma, for eliciting actual information, either from school authorities, or from school records.

A revised version of this instrument was received here by the end of January 1972. A few modifications were made, and a few items were added and a few deleted, in order to adapt the instrument for studying the schools of the Varanasi district. It was then translated into Hindi, which was then pre-tried out to ensure that it worked satis factorily. The finalized version was mimeographed. This finalized version has been used. The Hindi version of this instrument, as developed by the Varanasi center, is entitled "Pathamik Sansthanon men upalabdha Shikshan Samagritatha anya subidhaón ki soochi". In brief this may be called the <u>School information and facilities Inventory</u>.

The face page contained items covering such information as the name of the school, its address, its location-- urban or rural and the date when the informations were collected.

The next part consisted of a checklist of facilities and school equipments-- both curricular and extra-curricular. This Facilities and Equipments Checklist was further sub-divided into the following 4 parts:

1. Instructional equipments of the classroom
2. Educational aids and equipments for the teacher and games facilities, and extra-curricular activities
3. Amenities and space facilities
4. Special facilities for extra-curricular activities

The next part was meant for obtaining information about the educational qualifications of the staff serving the school. Educational level was tri-chotomized into the following classes:

a. Trained graduates;
b. Untrained graduates and trained matriculates; and
c. Untrained matriculates and trained non-matriculates.

The last part was in the form of a table, in which the number of students actually present in the different classes, on three different dates, were to be recorded. The three dates are: 5th, 10th and 25th of the month. If the information from any school is collected on any date after 25th, the figures for the numbers of students present for the same month are taken; otherwise, if the date of collecting information is earlier than 25th, the figures for the preceding month are recorded. This statistics is used for computing the teacher-pupil ratio.

Method of Scoring

In the present study 8 different variables have been conceptualized and brought under the general rubric of 'School Variables'. These are shown in Table 6-1. in their serial order according to the over-all plan of data analysis.

Table 6-1

List of variables included under 'School Variables'

No.	Variable No.	Name of Variable	Categories
1.	14	School management	a. Government and local bodies b. Private, aided c. Private, unaided
2.	15	Sex composition	a. Boys school b. Girls school c. Co-educational
3.	16	School size	a. Large b. Medium c. Small
4.	17	Shift system	a. Single shift b. Double shift
5.	18	Medium of instruction	a. Mother tongue (Hindi) b. English
6.	19	Teacher qualification.	a. Poor b. Average c. Good
7.	20	Teacher-pupil ratio	a. Poor b. Average c. Good
8.	21	Equipment and facilities	a. Poor b. Average c. Good

All the information required for obtaining scores corresponding to variables 14 through 21 were sought to be collected through this instrument.

It will be readily seen that information for the following variables were readily available from the <u>School Information and Facilities Inventory</u>:

Variable No. 14 School management

Variable No. 15 Sex composition

Variable No. 17 Shift system

Variable No. 18 Medium of instruction

In reality, school management-- whether the school is aided, unaided, private, government or local bodies managed, etc. were taken into consideration even during the original sampling of schools. The 'shift system' became a degenerate variable for the present study as all the schools included in the sample happened to be single shift schools. Again, with the exception of one school in the urban area, all schools were Hindi-medium schools. In the urban and rural areas there were some exclusively girls primary schools. Likewise, in the urban area there were some exclusively boys schools also, included in the sample. In the rural areas, some schools which were designated as boys schools, would enrol girls, as a matter of principle, should there be demand from the students for such enrollment. This principle applies to urban schools also-- all primary schools in the state being, in principle co-educational, unless it is exclusively designated as a girls school-- where male children could not be enrolled. Usually both in towns and in the country, if there is a girls school avaialable, then all girls tend to seek enrollment there. However, there are instances to the contrary: some girls obtain enrollment in a boys school even though there may be available an exclusively girls school within the village. This type of situation is generally found in villages but not in cities.

The remaining four variables, viz., # 16 - School size, # 19 - Teacher qualification, # 20 - Teacher-pupil ratio, and # 21 - Equipment and Facilities, had to be scored according to formulas developed and provided by the Bangalore Center, which are briefly described below.

1. <u>School size</u>

This is an index derived from the total enrollment of the school at the time of the first visit to the school.

This figure was taken into account while drawing samples of schools. Depending upon the following given ranges for total enrollment specific indices were computed:

Total enrollment not exceeding 199 ---------- Small

Total enrollment between 200 and 399 -------- Medium

Total enrollment above 400 --------- Large

2. Teacher Qualification

The index of 'teacher qualification' for a school is calculated by using a special linear weighting formula developed by the Bangalore center. The steps are as follows:

1. The frequency of teachers in each of the following three categories are first found out:

i. Number of teachers who are trained graduates - F1

ii Number of teachers who are untrained graduates or trained matriculates -- F2.

iii Number of teachers who are un-trained matriculates or trained non-matriculates -- F3.

2. Then the Index of Teacher Qualification of the school is given by the formula:

$$I_{TQ} = \frac{30\ F1 + 20\ F2 + 10\ F3}{F1 + F2 + F3}$$

3. This raw index of Teacher qualification is then converted into qualitative ranks as follows:

Index of Teacher Qualification	Equivalent Qualitative Rank
Below 14	Poor
Between 14 and 20	Average
Above 20	Good

It will be seen that for each school, there will be a Teacher Qualification Index score, as well as a qualitative rank for the same. Statistical analysis can be done by using either of the two measures.

3. Teacher-pupil Ratio

The steps for calculating a qualitative rank for each school on the basis of its teacher-pupil ratio are as follows:

1. The average attendance of each grade is calculated from the attendance figures on the 5th, 10th and 25th of the current month or the previous month for each grade.

2. Next special tables are referred to, one for rural schools, and another for urban schools, to obtain a rating for each grade. The conversion tables for obtaining ratings corresponding to different average attendance figures for different grades are shown in Table 6-2.

Table 6-2

Ratings corresponding to average attendance for different grad

Grade	URBAN SCHOOLS Rating of the School 3	2	1	RURAL SCHOOLS Rating of the School 3	2	1
I	31	32-45	45	20	21-38	38
II	26	27-43	43	16	17-30	30
III	26	27-43	43	13	14-27	27
IV	31	32-44	44	12	13-26	26
V	31	32-44	44	16	17-30	30

3. Next the ratings obtained by each of the five grades are summed and then divided by five. This is important where there are more than one section in any grade. The average ratings so obtained is meant for entering a special table for obtaining the consolidated "pupil-teacher ratio" rating of the school. This table is shown below as Table 6 -3.

Table 6 -3

Consolidated ratings corresponding to different ranges of average ratings of teacher-pupil ratio

Range of Average Teacher-pupil Ratio	Consolidated Rating for the School
Above 2.60	Good
1.42 to 2.60	Average
Below 1.41	Poor

Here, again it will be seen that for each school we may obtain a trichotomous consolidated rating of Good, Average or Poor, or actual average teacher-pupil ratio rating score. Statistical analysis can be made with both these measures.

4. <u>Facilities and Equipment Scale</u>

The scale comprizes a checklist of 57 items divided into four categories:

a. Aids and accesories available to teachers

b. Educational facilities and equipments available to students

c. Accomodation and spatial facilities

d. Provision for extra-curricular activities.

The steps are as follows:

1. The response to each item of the check list is marked 'yes' or 'no' on the basis of an inquiry from one or more knowledgable persons of the school, such as the headmaster, or a senior, experienced teacher.

2. All 'yes responses in each of the four subscales are then summed.

3. Let the sum of 'yes responses in the four subscales be denoted by N_A, N_B, N_C, and N_D respectively. Then an index of 'Facilities and Equipment' for the total scale is obtained by computing an weighted sum of the four subscale total scores. The formula is

   Index of Facilities and Equipment = $3.5 N_A + 0.75 N_B + 5.64 N_C + 2.55 N_D$

4. A qualitative ranking in the scale can be obtained by converting the index of 'Facilities and Equipment' into equivalent ratings by referring to Table 6-4 given below

Table 6-4

Consolidated ratings corresponding to different ranges of values of the 'Facilities and Equipment' Index

Range of value of the 'Equipment and Facilities 'Index	Rating of the School
Above 76	Good
48 -76	Average
47 and below	Poor

As in the case of other two subscales, for this subscale also we can obtain both a qualitative rating, as well as a score, reflecting the standing of each school in terms of facilities and equipments available in it.

The Bangalore Center has also provided two charts in the form of a ready reckoner for computing this index, once N_A, N_B, etc. have been obtained.

The A subscale contains 10 items, and the B subscale contains 36 items. The first chart has tabled the ($3.5N_A + 0.75N_B$) values for different combinations of values of N_A and N_B, the former varying from 1 to 10 and, the latter varying from 1 to 36. N_A is shown against the row, and N_B against the column.

Again, the C subscale contains 4 items, and the D subscale contains 7 items. The second chart has tabled the ($5.64N_C + 2.55N_D$) values for different combinations of values of N_C and N_D, the former varying from 1 to 4 and the latter varying from 1 to 7. N_C is shown against the column, and N_D against the row, in the chart.

By adding the two values obtained by referring to the charts the overall index of 'Facilities and Equipments' is quickly obtained.

II. PERSONAL AND FAMILY BACKGROUND SCHEDULE

In the original plan of this study it was proposed that a standard socio-economic status scale will be used for assessing the personal and family background conditions of the subjects. For this purpose the two scales available for Indian conditions, viz., Kuppuswamy's SES scales for urban households, as well as an Indian adaptation of an SES scale used by the Gandhian Institute in an earlier cross-cultural study ("World in 200 AD") were tried during the pre-pilot and pilot stages.

But many shortcomings of these three scales were discovered and were discussed in all the meetings of the Honorary Project Directors. No consensus could be reached with the regard to the use of a composite SES scale which would apply equally well to different regions of the country where the study would be conducted, and also would be suitable for both urban and rural households. In one of the meetings of the Honorary Project Directors it was decided that instead of insisting upon a search for a satisfactory SES scale, the essential common denominators of all SES scales should be ascertained first. There was a consensus that the following comprized the common core of the most commonly known SES scales now in current use:

a. Father's education
b. Mother's education
c. Income of the family

d. Occupation of the father

e. Occupation of the mother

Whether or not information should be collected for these items separately or they could be combined, and if so, how, in order to evolve a composite scale was left undecided. The impilicit understanding was that this question of using or not using a composite SES scale should be considered heuristically as well as pragmatically, at the level of data treatment and data analysis.

According to the research staff of the Varanasi Center, keeping in view the fact that the investigation was covering the rural areas of the entire Varanasi district also, besides the city of Varanasi, the specific contribution made by caste, and religion, in determining the final position of a family in the socio-economic hierarchy cannot be ignored: ignoring of such information would be unscientific, amounting to distortion of reality. Therefore, in the instrument specially fashioned by the Varanasi Center, those two items, religion and caste, were included.

The instrument which was translated into Hindi contained items covering the following areas:

1. Personal information about the subject, such as name, age, sex, name of school, grade, date of birth, religion and caste.

2. Information about the father, mother or guardian, and some other members of the family, with regard to education occupation, land holding, total income of the family, number of members in the family, etc.

3. Information regarding the address of the subject-- so that, in case of need, he could be contacted either through post or in person.

4. The last section consisted of a check list of material possessions, such as animals, farming equipments, cycle, radio, sewing machine, telephone etc. There were only 11 items in this section.

This instrument was so fashioned that most information could be elicited from the young scholars themselves-- some of whom would be only $5\frac{1}{2}$ to $6\frac{1}{2}$ years in age. The items were such that the teachers of the class, older brothers or sisters of the subject, or knowledgeable persons of the locality could corroborate or supplement or rectify the information supplied by

the young subject. This was important because of the relative immaturity of many subjects. Such difficulty arises only infrequently, and is rare with students of Grade V. In very rare cases the guardians of the child could also be contacted to obtain missing information.

These two instruments completely covered all variables proposed to be investigated as independent variables.

B. Instruments Dealing with the Intervening Variables

It may be recalled that the design of the study envisaged investigation of four variables under this category:

1. Social maturity
2. Moral relativism
3. Social acceptance
4. Intelligence

For assessing social maturity the scale developed by the Bangalore Center was used; likewise moral development was assessed by the scales developed by the Hyderabad Center. The Varanasi Center developed a Sociometric test for assessing social acceptance in terms of popularity within the child's own peer group. Lastly, it was decided by all centers that the non-verbal Porteus Maze Test would be used for obtaining a measure of intelligence of the subjects. These four instruments will now be described in that order.

1. Scale for Social Maturity

This scale, developed by the Bangalore Center, in the original version consisted of two different scales, one for urban children and the other for rural children. In the final version one unified scale has been developed, comprizing 65 items.

In this scale the measurement of social maturity is postulated to depend upon the possession or non-possession of certain behaviors associated with social characteristics broadly classified under the following categories:

i. Self-direction
ii. Locomotion
iii. Communication
iv. Co-operation

Self-confidence
Friendship
Ability to withstand stress
Leadership

The scale consists of 65 items of typical behaviors and actions of the school children, varying from 5 years to 14 years

in age. Any teacher of the school who has first-hand and thorough knowledge about the child in question is asked to indicate whether each item of behavior in the scale applies to the subject or not. For each item mentioned in the scale, the manner and extent of the pupil's habitual behavior is recorded in terms of three possible categories:

1. Does it habitually ($\neq$)

2. Has not done it, but given opportunity, will do it ($\underline{\neq}$)

3. Does not do it

In this way each of the 65 items in the scale gets a score of $\neq$, $\underline{\neq}$, -. Next, the Social Maturity Age is calculated by referring to a chart provided by the Bangalore Center, which gives : (1) the basic 'social maturity age' corresponding to each item, and (2) a difference score corresponding to that item.

First the basal age is established for any subject, by nothing the age corresponding to that item of behavior, upto which he has been marked ($\neq$) <u>Continuously</u>. Next for any item marked ($\neq$) after the basal age item, the corresponding difference score is added, <u>as it is</u> . Again, for any item marked $\underline{\neq}$, after the basal age item, the corresponding difference score is <u>halved</u>, and then added. In this way, all difference scores are recorded and then added to the basal age, giving a total 'Social Maturity Age' score, for the subject.

The advantage of the unified scale is that it is not only elegant to administer, but also permits comparison between groups of urban and rural children in terms of Social maturity.

2. <u>Scale for Moral Relativism</u>

This instrument, in its final Hindi version was entitled <u>Naitik Vikas Parikshan</u>, which means something like moral development assessment', or 'moral development measurement' or 'moral development scale.'

It is difficult to find out how, under what circumstances, and for what reason, the variable to be studies had been termed 'moral relativism', whose meaning is somewhat obscure. The Hyderabad Center, which had originally grappled with the problem of developing an appropriate instrument for measuring processes like development of moral and ethical discriminatory

abilities in the child, had turned to using the term 'ethical discrimination' rather than the term 'moral relativism', which appears to be justifiable. Since the expression 'moral relativism' has been used from the beginning, it will be retained only as a measure of expediency, and desire to avoid confusion. The dimension which in reality has been sought to be studied in this project is "development of moral and ethical discriminatory functions", though for reasons of expediency the instrument will be continued to be called 'moral relativism' scale. The reader is requested to keep this point in mind.

This instrument consists of three sub-scales:-

i. Social reaction
ii. Moral problems
iii. Offence evaluation

i. <u>Social reactions</u>

There are six items in the form of questions each with three alternative answers, one of which is only correct. The total number of correct answers checked by a subject is his score for this sub-scale.

ii. <u>Moral problems</u>

The format of this subtest is the same as that of the first subtest 1. Here also there are six items in the form of questions, each with three alternative answers, only one of which is correct. The total number of correct items checked by a subject is his score for this subtest.

iii. <u>Offence Evaluation</u>

This subtest consists of 15 items, each in the form of, pair comparison statement, between 7 kinds of offences and 5 kinds of punishments. For any pair of offences there is a column in which the subject has to indicate which of the two offences is more serious. Side by side, a pair of punishments is also given, and the subject has to indicate which punishment is right for which offence with its appropriate punishment.

The scores obtained from the three sub-scales are summed to obtain a total 'ethical discrimination' score. A maximum of 27 points would represent perfect moral-ethical discriminatory ability.

The Hindi version of the test which was developed at the Varanasi Center had a special format in which the test is

presented, which is a little different from the original version developed by the Hyderabad Center.

This test has to be administered individually in Grade I, and either as a group test or an individual test in Grade II, and as a group test in Grade V. Whether it should be used as a group test or individual test depends upon the level of reading ability of the students of a particular grade, or of a particular child. The question of comprehension is important.

3. <u>Sociometric Test for Measuring Social Acceptance</u>

This test was developed and revised several times by the Varanasi Center. A manual giving details of its reliability, validity and the method of its administration has been prepared. The test is very short but requires that precise instruction be given to the children, specially when they are very young.

In the Hindi version of the sociometric test, the investigator addresses the children of an entire class- or section of a class- from which subjects have been sampled, in the form of a discourse, consisting of a set of very easy and short statements and questions, which deal with familiar matter around the activities of the children in which several children may co-share in some action, play, or task. Then each child is gradually persuaded to write down the names of his best three friends, in order of preference. Each child in the class is provided with a specially prepared answer sheet, in which the child writes down his name, class and date first, and then the names of his three best friends. In Grade I, while the instruction is given in a group, actual filling up of the names of the three best friends has to be done on an individual basis-- because the child may not be able to write down the names of his friends correctly.

Two items of instruction are important: (1) In the sociometric test, the entire class or section, from which subjects have been sampled, takes part in the test-- because the intention is to determine the popularity or sociometric status of particular subjects within his own peer group, that is, within his class or section; (2) The choices of friends are confined within the same class or section, and names of friends, or brothers, or sisters not in the same class are excluded from being mentioned by any chooser.

Computation of Sociometric Status Index

The sociometric status index, S_i, for an individual i, is given by the following formula:

$$S_i = \frac{C_i}{T - C_0} \times 100,$$

Where, C_i - Number of choices received by idividual i, inclusive of first, second and third preferences

T - Total number of choices exercised by all students of the class or section in which the test has been administered

C_0 - Number of choices exercized by individual i.

If there are N students in a class or section, then normally T will equal 3N, if and only if, all the N subjects have exercized their full quota of 3 choices each. Sometimes this is not the case, as some young children may write the names of only two or even one friend. Likewise, theoretically C_0 should be 3, but sometimes it may be 2, or 1, or even 0. Therefore, this value of C_0 should be found out for each of the individual subjects included in the study sample.

4. Porteuz Maze Test

A need was felt for using a test of general intelligence, which would be suitable for pre-adolescents with little linguistic or verbal ability, and preferably, could be used by all Centers. Necessarily, the test has to be of the non-verbal, performance type, and more importantly, culture-free. The test being essentially culture-free is important because the test is meant to be administered at urban as well as rural areas, widely varying in culture, socioeconomic conditions and environmental enrichment. Several well known non-verbal tests of intelligence, such as the Wechsler Intelligence Scale for Children (an Indian version of which is available, fabricated by Reverend A.J. Malind of Bangalore), and the Bhatia Battery of General Intelligence, were tried out during the pre-pilot stages. Ultimately the choice fell on the Porteus Maze Test.

The Porteus Maze Test consists of line drawings of mazes, of increasing complexity, corresponding to different mental ages. Starting with the age of III, there is a test for each of the ages IV, V, etc through XIV, and one last for adults.

In this study, the tesing was always started with the test corresponding to age V, irrespective of the age or grade

of the child. The child is required to trace a path through the maze. If the child draws the maze correctly, he is given the test sheet for the next higher age. This process is continued until he commits an error, such as going into a blind alley, or retracing his step, or crossing walls and barriers. Two more trials are allowed. When he fails all the trials of the same age, the age where he passed by the third attempt establishes his Basic Score in years. Next he is given the test sheet for the next age, and allowed three trials as before. This is continued, if he passes by the third attempt. If he fails in this test also, the testing is continued with the testing sheet of the next age, until three failures each in two successive age-tests occur, when the testing is stopped. The mental age is calculated by adding credits for completed tests beyond the Basic age. By dividing the mental age by the chronological age of the child, and then multiplying by 100, his IQ is calculated.

The Porteus Maze test is strictly an individually administered test. The investigator has to ensure that standard procedures are observed: no deviation from them can be permitted, such as lifting of the pencil, or retracing of steps or exploratory moves by fingers through the maze.

Actual experience has shown that the Porteus Maze test offered many advantages. Some of those are summarized below:

a. It is simple, inexpensive, and easily administered.

b. It is by and large a culture free test of intelligence.

c. It can be administered to children of the age group of 3 to 16, varying in intelligence level.

d. It is relatively free from the influences of previous learning, experience or exposure. Children of all ability levels, if free from any severe psychomotor disability which handicaps him to the extent of an inability to trace a line by a pencil, can take this test.

e. It is a quick test, and the scoring is also done quite quickly.

f. Most probably it is also not very much subjected to practice effect-- so that it can be administered a second or third time, with not too long a time gap separating the administration of the tests.

g. Very simple instructions are sufficient to set the child to the test taking task.

Inspite of all these advantages, one limitation of this test should be pointed out. To the extent general intelligence is loaded with linguistic and verbal ability, the results of this test does not reflect that part of intelligence. Porteus Maze test IQ or mental age is best interpreted as a measure of non-verbal intelligence of the subject.

C. INSTRUMENTS DEALING WITH DEPENDENT VARIABLES

There are three major variables under this category, viz., Achievement in Language, Achievement in Mathematics, and Perceptual Organizing Ability. The three instruments corresponding to these variables are as follows:-

1. Achievement Test for Hindi
2. Achievement Test for Mathematics
3. Indian Adaptation of the Lowenfeld Mosaic Test

These instruments are described below.

I. ACHIEVEMENT TEST FOR HINDI

The achievement test in Hindi, which has been developed by the Delhi Center, is in three versions, corresponding to Grades I, II and V.

a. For Grade I, there were three test booklets entitled as follows:

i. Shabda Pahchan (Word recognition).
ii. Vakya Bodh (Sentence comprehension).
iii. Chitra-Vakya Jorna (Sentence-picture association).

The first test for Grade I, Shabda Pahchan-na, is an attractive booklet consisting of 30 items. In each item there is a clear line drawing, and there are four words by its side. The words are spelled similarly, one of the four being the correct one. The child checks the correct word. The words become increasingly more difficult towards the end of the test.

In the next test for Grade I, Vakya Bodh, each item consists of four separate boxed pictures, which represent certain degrees of variation as well as similarity, of the same theme. There is a sentence underneath the set of the four pictures given above. The subject reads the sentence, and then checks the box containing the picture which corresponds to the sentence beneath the pictures. There are 17 items in this test.

The third test for this grade, Chitra-Vakya Jorna, is similar to the previous test, with one difference. Here too

there are four boxed pictures, with some features similar and some dis-similar in each. By the side of the set of the four boxed pictures, which is always arranged in a vertical column, there are four sentences, arranged in a random order, each sentence corresponding to one picture of the set on the left. The order of the 4 pictures and the 4 sentences are not the same. The subject is required to read each sentence, and then identify which of the 4 pictures corresponds to which sentence, and then trace a line from the picture to the corresponding sentence. In this way he connects each of the 4 pictures with its corresponding picture. Since there are 12 sets of 4 pictures (and 4 sentences) in this section, the maximum score is 48 for this subtest.

In Grade I, the maximum possible total score in the language achievement test is thus 30+ 17+ 48= 95.

b. Test for Grade II. Just as for Grade I, for Grade II also there were three separate subtests entitled as follows:

i. Chitra Vakya Jorna (Picture- Sentence Association).
ii. Padhho aur Karo (Read and Do)
iii. Vakya Purti (Sentence Completion).

The first subtest, Chitra Vakya Jorna, is the same as that for Grade I, and need not be described again.

The next subtest, 'Padhho aur Karo' requires the subject one or two or three acts, viz., 'mark with a cross x', 'mark with a circle O', or 'mark with an underline ------. Each item consists of a boxed picture, which contains 3, 4 or more distinct items, either separately, or as connected parts of a larger whole. Beneath the boxed picture, there is a brief description of the picture above, and the subject is asked to carry out one or more specific instructions, such as 'put a cross x' on a particular item in the picture, or perhaps 'put a circle O' around another item, or 'underline' another item within the same picture. The pictures and instructions corresponding to them become increasingly more difficult and complicated toward the end of the test. Even though there are 18 items in this subtest, the maximum possible score is 20, in terms of the total number of instructions to be carried out.

The last subtest for this grade has 20 items, Each item is in the form of a sentence with a blank in it. Beneath the sentence there are 4 different words, of a similar meaning

or construction, only one out of which makes the Sentence meaningful. The subject is required to read the sentence (with the blank) first, then scan the four alternative words given below and select the one correct word from the set and write it down in the blank space in the sentence. The maximum possible score for this subtest is 20.

For Grade II then, the maximum total score for all the three subtests together is 48 ≁ 20 ≁ 20= 88.

c. Test for Grade V. There were three subtests in Hindi for Grade V, named as follows:

i. Samanarthak Shabda (Synonyms Test).
ii. Viparitarthak Shabda (Antonyms Test).
iii. Pathan Bodh (Reading Comprehension).

The first subtest in this series, samanarthak Shabda, consists of 40 items. Each item consists of a word in the beginning, followed by four alternative words, one of which is synonymous with the first (lead) word. The subject reads the first word, and then scans through the set of 4 alternatives, and chooses the correct synonym, and then underlines it. Since only one word is correct, the maximum possible score for this subtest is 40.

The second subtest in this series, Viparitatrthak Shabda, is similar to the first subtest, with this difference--- the lead word is followed by four alternatives, one of which is opposite in meaning to the lead word, which the subject has to identify. There are 30 items in this subtest, hence the maximum possible score is 30.

The last subtest in this series, Pathan Bodh, seeks to measure reading compr.hension. In this subtest each item consists of one or more paragraphs, of a description of some event, or some natural phenomenon. Following each paragraph or set of paragraphs, there are a few questions, 4, 5 or 6 in number, which are related to the paragraph (s) given above. Four alternative answers are given to each question, one of which is only correct, the rest being incorrect or irrelevant. The subject is required to mark the correct alternative answer. There are six sets of paragraphs in this subtest, but the total number of questions based upon them is 30, so that the maximum possible score for this subtest is 30.

The maximum possible total score for the three subtests for the achievement test in Hindi for Grade V is thus 40≁30≁30= 100.

All these tests were developed and printed by the Delhi Center, and supplied to those centers which were using the same viz., Varanasi and Ranchi.

II. <u>Achievement Tests in Mathematics</u>

Just as for the tests of achievement in Hindi, there were three different series of achievement tests in Mathematics corresponding to the three grades I, II and V. All these tests were developed by the Delhi Center. Other centers participated in the try-out, in the light of which the finalized versions of the three tests were prepared. These are described below.

1. <u>Mathematics Achievement Test for Grade I</u>

The test booklet used by the Varanasi Center is in Hindi in which the numerals are also in Hindi character. Another version, also in Hindi, with Roman (international) numerals, is available.

The test comprizes 40 items. One item involves recognition of simple geometrical forms; another item involves matching of pictures of coins of varying values with pictures of commodities with corresponding prices. The remaining items, involve counting, recognition of numbers, seriation, the three fundamental operations of addition, subtraction and multiplication. The maximum possible score of this test is 40.

2. <u>Mathematics Achievement Test for Grade II</u>

There are two versions of this test - one, printed by the Delhi Center comprized 30 items, all of them belonging to arithmetic. This version had also Hindi numerals. The Varanasi version is essentially an alternative version of the same test, in which almost all the same items have been retained. However, the items have been rearranged in order of increasing difficulty. A few items have also been replaced.

There is just one item which involves recognition of coins from pictures of four different forms given. The rest of the items involve the usual arithmetic operations of addition, subtraction, multiplication and division. Each question is provided with four alternative answers, one of which is correct. The subject is required to mark the correct alternative. There are questions on mixed numbers, on place values of numbers, and conversion of lengths and weights from one unit to another.

The maximum possible score in this test is 30.

III. Indian Adaptation of the Lowenfeld Mosaic Test

One of the intentions of the study conducted at the Varanasi Center is to investigate the nature of the cognitive growth of children which can find expression without any verbal or linguistic instrumentality. The Lowenfeld Mosaic Test has been traditionally used as a projective test for studying what Bell (1948) has call 'expressive movement' that is, how certain motivations, dynamic dispositions of personality or inner compulsions find expression through movements of psychomotor functions, usually by manipulating unstructured or semi-structured stimulus material. Chatterjee (1968) has used the expression 'performance type of projective tests' for conveying the same meaning as expressive movement' Chatterjee (1971) has advocated making systematic efforts for exploring the use of the Mosaic Test for studying perceptual-cognitive abilities as a function of growth and development, in which verbalization is minimized, if not completely eliminated. In the present study, the Mosaic Test has been used for the major purpose of obtaining some fairly objective measure of the child's ability to organize semi-structured stimulus material along aesthetically pleasant and commonly shared perceptual-organizational dimensions.

The tests that has been used is the Indian Adaptation of the Lowenfeld Mosaic Test, which has been developed and researched with by Chatterjee and his associates over the last two decades. (Vide Chatterjee 1968, for a comprehensive bibliography). A brief description of the test material and method of its administration follows.

Test Material

The presrnt Indian adaptation of the Lowenfeld Mosaic Test fabricated by Sharma and Chatterjee (1966) consists of 360 thin pieces of geometrically shaped colored plastics. The distribution of the 360 pieces among the six color and six from combinations is shown in Table 6-5.

It will be seen that the distribution of the 360 pieces among the six shapes and six colors is absolutely symmetric there being 10 pieces for each of the 36 different color-shape combinations. There is a tray with a dull white color which measures 26" by 19". The material is carried in a flat wooden box.

Table 6-5

Distribution of 360 plastic pieces among six shapes and six colours

Shape	Colour Red	Green	Blue	Yellow	Orange	Black	Total
1. Square	10	10	10	10	10	10	60
2. Rectangle	10	10	10	10	10	10	60
3. Rhombus	10	10	10	10	10	10	60
4. Equilatteral Triangle	10	10	10	10	10	10	60
5. Isosceles Triangle	10	10	10	10	10	10	60
6. Cross	10	10	10	10	10	10	60
Total	60	60	60	60	60	60	360

<u>Method of Administration</u>

The first step is to seat the subject in a comfortable position, with the box kept somewhat to his right front. The lid of the box is opened flat out. Next the folded tray is lifted up, out of the box, and unfolded, making the rectangular field on which the subject is to prepare a design. The tray is placed in front of the subject. As soon as the tray is taken out, a drawer is exposed to the view, which contains 36 chambers, in each of which are stacked 10 pieces of the same color-shape combination. The whole arrangement is like that of a symmetrical matrix in which the rows are the six shapes, and the columns are the six colors.

The experimenter now says to the subject:-

"This is a play in which you make something..... you make anything you like with these pieces."

So saying, the E takes out a few pieces at random from the compartments, but the number of pieces does not exceed six. He places them at random on the tray, and moves them tentatively. The E <u>appears to arrange</u> the pieces as if to give them a concrete shape, or in some meaningful fashion, but stops half-way, disarranges the half-formed design, picks up the pieces and replaces them in their proper chambers carefully. He then tells the S :

"You go ahead now." The E adds:

"You are free to use as many pieces as you wish of any colour or any shape. There is no hurry. You may make anything you want."

Ideally there should not be any restriction on the time allowed to any S. But some subject may go on and on, as if intending to use all the pieces available. Some have no plan, but goes on lifting pieces one after the other in a completely random fashion. In such cases, the subject can be asked to stop after 15 minutes.

Some shy subjects require a lot of promptings before they start making a design. Patience and gentle persuasion are needed with such cases.

The next important step is that of obtaining a permanent and faithful replica of the design made. There are three methods for obtaining a replica of the design. These are:

i. Photographic Method
ii. Copying Method
iii. Replicating Method.

The last method, because of its comparative economy and superior quality of the replica over the other two methods, has been used in this method. This method is described below.

In this method, the E makes use of pieces of colored papers which correspond in color and shape, and in size, with the actual plastic pieces. First a transparent paper, like tracing paper or tissue paper, is spread over the tray fully covering the mosaic design, and its position is fixed by placing four weights on four corners of the paper. Next, the shapes of the separate plastic pieces are outlined on the paper by a pencil. Care has to be taken to see that position of the plastic pieces are not disturbed. After that on the tracings of each piece its colour is recorded using some code such as r for red, b for blue, o for orange etc. When this is completed, the paper is lifted, and the plastic pieces are replaced in their respective compartments.

The tracing is on the backside, of the tracing paper. So it is turned round and placed on the tray. The drawer containing the 36 compartments for plastic pieces is now lifted from the containing box and placed outside, revealing another set of 36 compartments at the bottom floor of the box, in which colored pieces of paper (opaque and glazed) of the

same shape, size and colour as the plastic pieces, are to be found in sufficient numbers. Pieces of paper are carefully picked up and pasted on the design strictly following the tracing visibl from behind the paper. When the paste dries up, the identification number etc are written on a corner of the paper, and the replica is ready for storage. In this way a very faithful replica of the original design is obtained.

This method of obtaining a permanent replica has several advantages, not possessed by the other two methods. If a good camera is available and cost is no consideration, colored phtographs can be obtained, which involves less labour. A uniform illumination of at least 300 watts from a distance of 5 feet should be used, with an aperture opening of 3.5, and speed of 1/25th of a second. With slower films, either illumination should be increased, or exposure time should be increased, and a blue or yellow filter should also be used. The colored photo will have one limitation: it will usually be of much smaller size than the original design--unless a very large enlargement is made, with prohibitive increase in cost.

The second method, of making a colored painting of the design on white paper is only possible when the E himself, or one of his staff member has some minimum competence in the art of drawing and painting, in pastel or water colour. If such is the case, he may prefer to use this method, rather than the more messy and time consuming method of making an exact replica as described above.

Scoring of Mosaic Designs

Since a permanent record is obtained, actual scoring can be done later at any convenient time.

So far as this study is concerned, three types of measures are obtained from the test protocols.

1. The first type of measures are related to overt behaviors of the S while he is engaged in making, so far as these could be observed by the E, with a fair degree of accuracy and objectivity. Some sort of a rough-and ready three-point rating scale is used by the E, during and after the making of the mosaic design by the S. The following items are included in the Rating Scale:

1. Willingness and co-operation of S
2. Attention to the task

3. Anxiety with the test situation
4. Carefulness in selection of pieces
5. Carefulness in the placement of pieces on the tray
6. Persistence towards the goal (that a particular design should be made)
7. Level of satisfaction after the design is ready
8. E asks the S, "Tell me, what is it that you have tried to make on the tray?" (Actual answer is recorded).

The first seven items refer to behaviors which can be observed without much difficulty, and satisfactory inter-judge reliability has been reported by researchers. Yet, a composite score obtained from the ratings is not psychologically very meaningful. Therefore, how such observed behavioral characteristics can be used in the persent study remains obscure.

2. The second set of measures refers to purely objective features of the mosaic design. These are: a. Time taken for completing the design; b. Number of sub-designs used; c. Location on the tray for making the design; d. Total number of pieces used- in different colors and shapes; e. Actual distribution of pieces among the six shapes and six colors; and f. Area of the tray covered, expressed as a percentage.

Only the last measure, 'area of tray covered' requires a special devise for accurate estimation. The method counting squares is used for this purpose. A transparent sheet marked with 1 cm. squares in the form of a grid is placed over the replica, and the number of squares that cover the design is counted. A square covered more than half by a piece is counted as one; and a square covered less than half of any piece is left out of the counting. Then the area of the tray covered by the design is

$A = \frac{2}{3187} \times 100$, expressed as a percentage, where A= area covered by the design expressed as a percentage, and a total number of squares covering the design.

It has been reported in previous research that almost all of the objective features of the mosaic design listed above appear to show systematic trends with varying age and other growth and maturational factors. Most of the above factors are not only objective but also precise, and all are measured in ratio scales, save the item 'location' on the tray. Therefore, from the point of convenience of data analytic procedures these measures are very satisfactory.

The present research is expected to throw additional light on the psychological meaningfulness or otherwise of these measures.

3. The mosaic design may be conceived as an example of imaginative production. Varying along certain qualitative dimensions. To make an estimate of those qualitative features of the designs, a rating scale was used by the present author in a few studies. The original rating scale contained 15 items which are similar to those used in Osgood's Semantic Differential, used in studying the psychology of 'meaning'. Later, cluster analysis and factor analysis helped in breaking down the set of 15 items in the scale into the following three relatively homogeneous subscales:-

1. The 'P' scale containing six items, mostly related the pattern qualities of the design.
2. The 'Q' scale containing also six items, mostly related to the aesthetic qualities of the design.
3. A miscellaneous m' scale containing 3 items, which do not easily cluster with the previous two subscales.

~~Teh~~ items in these three subscales are used as three-point graphic rating scale items. The items of the 'P' scale are:

concrete-abstract; full-empty; coherent-incoherent; angular-rounded; geometrical-amorphous; and expansive-restricted. Likewise the six items of the 'a' scale are: beautiful-ugly; symmetrical-unsymmetrical; harmonious (shape)-non-harmonious (shape); harmonious (color)-non-harmonious (colour); pleasant-unpleasant; and rich (in imagination)- poor (in imagination). The three items of the 'm' scale are: dynamic/static; balanced-unbalanced; and simple-complicated.

A 3-2-1 point scoring is used. The maximum possible score for the 'p' scale is 18; it is also 18 for the 'r' scale; and for the 'm' scale it is 9. The maximum possible score for the three scales together is thus 45. Likewise the minimum for the 'a' and 'p' scales is c each, and for the 'm' scale it is 3. Hence the minimum total score possible is 15.

At least three sophisticated judges are used for obtaining the ratings of the mosaic designs. The ratings for all the judges for each subject are summed and averaged. A high score, in one of the 3 subscales, or in the total full scale, is indicative of a more aesthetically satisfying and imaginative product.

It will be seen that from the mosaic replica, two types of scores are obtained which lend themselves to sophisticated methods of statistical analysis.

Before we close this chapter, we may very briefly recapitulate the list of tests used, to point to one interesting feature-the source of information and/or data, is of three types. One type of source is the members of the staff of the school, guardians of the subjects etc. Another type of source is the entire class of pupils from which subjects have been drawn to constitute the study sample. The last type of source is the subject himself. This is brought out in Table 6-6. It will be seen that the source of data for all tests related to the dependent variables is the subject himself; this is also true for two of the tests belonging to the category of intervening variables. There are more than one source of information for the remaining four variables, belonging to the independent variables.

Table 6-6

Source of information for different types of tools used in this study

Instruments used	Source of Information
1. School variables schedule	H.M/Staff of school
2. Personal and Family Background Schedule	S himself; his guardians; staff; knowledgable members of the neighborhood
3. Social Maturity Scale	Staff
4. Moral Relativism Scale	Subject
5. Sociometric Test	All members of the class to which the S belongs
6. Porteus Maze Test	Subject
7. Language Achievement Test	Subject
8. Mathematics Achievement Test	Subject
9. Mosaic Test	Subject; sophisticated judges for ratings

The table shown above shows the scope of this study, its depth, and the fairly complicated nature of the data collection sources. Naturally, an enormous quantity of data was generated.

CHAPTER- 7

Operational Details of Procedure(2) --- Administrative Matters and Phasing

In the actual carrying out of the present study, though the main, most important, and ultimate source of information and data were young school children, several classes of people were involved in reaching them and generate the required data. Without the help and willing co-operation of these classes of people, a study of this type cannot be accomplished. In reports of this type of reasearch, essential information about these administrative and operational aspects is either scanty, or is absent. But such information may be of considerable value to other researchers, and person concerned with the operational aspects of such studies. Therefore, some essential details of these administrative matters regarding this study are briefly described below.

Contacting persons at various levels: A very large number of persons, directly or indirectly, had to be contacted, at varying time points of this study, as the following description will make clear.

1. Various members of the Delhi Centre (NCERT) connected with the project had been contacted continuously and frequently for administrative, financial, and technical purposes. Since the Delhi Centre is the coordinating agency for the seven-centre study operating all over India, it had to be contacted more frequently than any other group of people. Again, the Delhi centre had the responsibility of fabricating the two crucial tests of criterion, viz., achievement in language (Hindi) and achievement in mathematics, which were to be used by all the seven centres.

Besides correspondence with the Co-ordinator of the project of the Delhi Centre, and other members of the project of this centre, there was another type of contact with the Delhi Centre. These were the three meetings of the Honorary Project Directors, the first of which was held at Bangalore in June, 1970; the second was held at New Delhi in August, 1971 and the third was held in August, 1972. Progress of work at various centres was thoroughly discussed, and important

decisions made in these meetings. These meetings in Delhi were always well attended, in which high level officials of the NCERT also participated. A last mini-general meeting was held at New Delhi in January 1973, in which project directors of Varanasi and Delhi Centres, along with some project staff, and statistical consultants were also present. In this meeting certain crucial decisions about processing of data and their subsequent statistical analysis were made.

Besides these full meetings, many other meetings were held between members of the Delhi Centre and the Honorary Project Director of the Varanasi Centre or his deputies.

There was also a lot of communication between Varanasi Centre, on one hand, and other collaborating Centres on the other, with regard to sharing of instruments developed by one or the other centre, methods of administration of the same, sharing of review of literature, method of data processing, and so on. Naturally, the contact between the Varanasi Centre, and Hyderabad and Bangalore Centres was considerable, because tests developed by the latter two centres were being used by the Varanasi Centre.

Coming to the actual work of the Varanasi Centre, officers of the Education Department of the State Government had to be contacted, first for obtaining list of aided, and other types of schools, for sampling of the schools, and then for permission to visit the sample schools for administering the tests.

An official letter was transmitted either by the Chief Inspector of Schools, or the Regional Inspectress of Governments Schools, to the Headmasters/Headmistresses of the sample schools, requesting them, at the official level, to give whatever help saught from them, in the matter of carrying out the study in their schools. After their letters had reached the Headmasters or Headmistresses of the schools included in the sample, appoints were sought, by correspondence in case of rural schools, and by personal visit or by phone, in case of urban schools to visit the school in question for testing. In this way the program of visiting the sample schools was drawn up, which was strictly followed so far as possible. The entire testing program was carried out in four phases, which necessitated visiting the majority

of the schools three times with certain time gaps; some rural schools situated at very great distances were visited only twice. Lastly, in order to catch a few stragglers among the sample subjects, some schools of the rural area, and some of the urban area, had to be visited a fourth time. But because of the good contact established with the schools during the first visit, second, third or fourth visits went off smoothly.

Phasing of the Testing Program

After all the instruments had been finalized and were available in sufficient quantity, the final found of testing, spread out over the three phases, was commenced in August 1972.

Phasing in the study occupied a very crucial position, because certain psychological problems were involved in it. Altogether nine different instruments had to be used for collecting all the needed information and data. These data and information had to be collected from about 10-20 children of Grades I, II, and V, and some information had to be collected from the staff, or guardians of some of the children. Again, during this visit, sampling of the final sample from each of the three grades had to be done. All these things could not be done in one day. Therefore more visits were necessary.

But more importantly, the two criterion tests, that is, achievement in Hindi, and in mathematics, could be administered only towards the end of the school session because, only at that time, the child could be expected to have learned their subjects in their classes through lessons given during the entire school session. The ideal time for testing would be just before the end of the school year, or just before the final annual examinations. But for practical limitations, this last phase could not all be packed to the very end. Many schools felt reluctant to spare time for this type of testing which is not directly related to the school curriculum or examination based thereon. Again, the final phase had to cover 31 schools spread all over Varanasi - the city and the far-flung district. The program of visiting schools had to avoid holidays, also. Effort was made to make this phase as short was possible. How the phasing actually worked out will best be seen from a chart shown in table 7-1.

Table 7-1

Details of phased visits to different schools for carrying out the testing program.

	Time Chart	Phase	No of Schools Urban	No of Schools Rural	Instruments Used
1972	July 31 August 1 Sept 1 October 1 November 1	I	01 02 03 04 05 06 07 08 09 10 11 12 13 14** 15*	16 27 17 18 29 19 30 20 31 21 22 23 24 25 26	1. Schools variables Schedule 2. Personal and Family background Schedu' 3. Porteus Maze Test 4. Mosaic Test
1973	Dec. 1 Jan. 1 Feb. 1	II	01 04 07 02 05 08 10 13 03 11 06 15	20 17 19 21 22 24 25 26 27 28	5. Sociometric Test 6. Moral Relation 7. Social Maturity
	March 1 April 1 April 30	III	01,02,03 04,05,06 07,08,09 10,11,12* 13,15	19 20 16*17, 18*21,22 23*24,25,26 27,28,29,30,31	8. Language Ach. 9. Maths. Ach
	May 1 June 1 July 1 Aug 1 Sept 1 Oct 1 Nov 1 Dec 1 Jan 1 Feb 1 March 1	IV. Used for catching stragglers - i.e., those who were absent in phase II and/or phase III.			

* No phase II visit to these Schools, Tests of phase II and Phase III admitted during phase III

** Phase I administered in this school on 30-9-72
Phase II administered in this school on 1-11-72

It will be seen that the I phase lasted for 3½ months from August 1, 1972 to November 15, 1972. Four instruments were used during this phase. The two tests, Porteus Maze Test and the Mosaic Test, which were not supposed to be much influenced by schooling were administered at this stage which was the beginning part of the school session.

The second phase lasted from 16th November 1972 to end of February 1973, i.e., again a period of 3½ months. Again 4 tests, which were supposed to be subjected to schooling experience only moderately were administered during this phase. In the last phase, which lasted 2 months, i.e., March and April, 1973, the two criterion tests were administered. Second phase visits to two urban schools, and six rural schools which were far off from Varanasi were skipped. During the III phase to these schools tests for phase II and phase III were administered together.

School No. 14, which was the only English medium school, had only two phases, the first in September, and the last in early November, 1972. The school year in this school started in January, and ended in November, hence these time table of testing had to be followed.

Some schools had to be revisited again, a fourth time, to catch some absentees who had missed being tested in the II and III phases. In about 8 schools in the urban area and a similar number in the rural areas, about 35 absentees were then contacted again and their test responses obtained in this last post-phasic visit, in order to bring both the rural and urban sample sizes to at least 300. When this target was reached, going after stragglers was stopped. In this way, complete protocols were available for 301 urban children and 302 rural children. This total compares well with 680 students in urban and rural schools that were tested during the I phase. Thus the original sample had been attenuated to the extent of about 11.6% over a period of 9 school months. This attenuation would have been still greater, about 16.2%, if the normally planned three visits only to the schools were adhered to. By making the extra, fourth visit to about 50% of the sample schools, the sample attenuation was reduced from 16.2% to 11.6%, that is about 4.6%. It is quite possible that if all the sample schools

were included in the 4th visit, sample attenuation would not have been more than 5 to 7 per cent.

This factor of sample attenuation might be introducing an element of bias in the final sample. It is possible that some of the absentees were the irregulars, weak students or drop-outs. Their elimination from the final sample would tend to bias the sample towards the positive side, that is, make the sample better performers in the school subjects.

----0----

CHAPTER- 8

Operational Details of the Present Study-(3)
Data Treatment, Data Processing and Data Analysis

From the outset, three major orientations have characterized the overall design of the present study undertaken by the Varanasi Center:

1. The first was to quantify all data comprehensively and completely - so that data analysis can be carried out by using statistical and mathematical methods, rather than interpretation at the qualitative plane. That is why, even though a projective technique, like Lowenfeld Mosaic Test was used, all data derived from the test protocol were quantitative in nature. This effort at quantifying was a strong and abiding trend of the entire Varanasi Center study.

2. The data were proposed to be analysed at two planes - one, at the explanatory plane - to find out how the variables are inter-related, and vary from one group to another. At the other plane, certain hypotheses were proposed to be tested, both by univariate and multivariate methods.

3. The design was so fashioned that it could generate data which would lend themselves towards multivariate predection of school performance, on the basis of knowledge about the children, which could be gathered with some measure of accuracy and reliability.

These three major orientations helped in the emergence of a structure for the treatment of data, for the processing of data, and their ultimate statistical analysis.

<u>Data Treatment</u>: All the protocols, whether belonging to the school variables or belonging to the subjects, were gone through carefully, and checked for any omissions, ambiguities etc.; some of the test protocols had to be scored and the part scores had to be combined to get total scores.

Scoring of the Mosaic Test designs was by itself a time-consuming job. It was decided that only the objective features, and the three rating scales of subjective qualities would be subjected to analysis in this study. The record of overt behaviors of the subject during test-taking, was not included among the data set for analysis.

<u>Data Processing</u>: In the next stage, master sheets of original scores and data were prepared, by using a tier-system. Urban and rural schools were arranged serially. Within each location, rural and urban, and within the same school, for the same grade, data from all sample children (both male and female) were recorded. During this process the children were given serial numbers, which became their identification numbers, which remained unchanged throughout, even when certain subjects were dropped from the final sample because of lack of data on one or more tests.

In the next stage, all the scores had to be converted into coded scores by using a special code which was developed in a meeting held at New Delhi in January, 1973. The coding was so developed that it could be used for transferring the scores to IBM cards for computerization of data analysis, Further, since many of the tests and tools were being shared by all the seven collaborating centres, the code was so developed that the first 49 columns could be used by all the centres, from 51 colums onwards, each of the seven different centres would be developing and using its own coding system.

The code book that was developed by the Varanasi Centre has been reproduced separately. In the code book, specific information is provided as to how scores are to be coded, and it had the following heads:

Card Column
Variable Number
Variable
Variable Category
Coded Score
Remark

Variable No. 1 through variable 21, that is, 21 variables belong to what have been called the Independent variables. Variable No. 22 through variable No. 24, and

variable No. 30 and 31, are what have been called the Intervening variables. Variables 25 through 29, and variables 32 through 39, are all dependent variables. Variables 40 and 41 are derived scores, one from the SES variables, and the other from school variables. These are also Independent variables.

In table 8-1 the disposition of these variables has been shown in some details.

Table 8-1

Disposition of three classes of variables after coding

Independent Variables		Intervening Variables		Dependent Variables	
Variable No.	Variable	Variable No.	Variable	Variable No.	Variable
1	DNP Centre	22	Mental Age	25	Language Ach-I
2	Location of School	23	IQ	26	Language Ach-II
3	ID No. of School	24	Social Maturity	27	Language Ach-III
4	ID No. of S	30	Moral Relativism	28	Language Ach-Total
5	Age-grade of S	31	Popularity	29	Arithmetic Ach
6	Sex of S			32	IAIMT -Time taken
7	Father's Education			33	" No. of Pieces
8	Mother's Education			34	" " " Subdesigns
9	Father's Occupation			35	IAIMT Area
10	Mother's Occupation			36	Rating Scale-I
11	Income			37	" " -II
12	Religion			38	" " III
13	Caste			39	" " Total
14	School Management				
15	School Composition				
16	School Size				
17	Shift System				
18	Medium of Instruction				
19	Teacher's Qualification				
20	Teacher-Pupil ratio				
21	School Facilities				
40	LINSES (SES)				
41	LINSEC (School)				

The coded scores, put in special IBM code sheets were then taken to the IBM computer Centre at D.L.W., Varanasi, from which IBM punched cards were obtained. The listing of the scores were carefully scanned twice to find out errors in punching, by comparing with the original coded scores. New cards were made replacing cards containing wrong punches.

At the last stage, all those cards which had any blank columns, were discarded from the deck of cards. This resulted in 301 cards for the urban sample, and 302 cards for the rural sample, giving a total

603 data cards. These deck of 603 data cards were complete in all respects - there were no missing data in any column.

These cards have been used by the Computer Centre of the P.E.O., Planning Commission, for computerizatiom of data analysis.

Computer Processing

Detailed instructions were given to the Computer Centre for carrying out the data analysis in a phased manner. The instructions sent to the Computer were arranged in the following sequential manner :

Section I. Mostly descriptive statistics, by identification of members of groups varying in homogeneity with regard to the independent variables.

Section II. Descriptive statistics continued, with marginals, percentages and measures of central tendency and dispersion for all variables, and all types of grouping.

Section III. Computation of significance of differences between group means of scores in the intervening variables and dependent variables.

Section IV. Computation of a variety of correlation measures among variables belonging to three categories-independent, dependent and intervening, both with and across categories.

Section V. Computation of correlations between chosen school variables in search of a satisfactory composite measure for "schooling excellence".

Section VI. Mostly multivariate computations for predicting performance in the criterion measures, and the IALMT.

Section VII. Miscellaneously and residual computations for specific purposes arising out of trends found in results of analyses obtained from previous sections.

Printouts of results of computations were obtained, from which tables, cross tables, and summary tables of varying complexity could be prepared, for the purpose of reporting the findings. Actual details of the procedures utilized for data analyses will be described in appropriate places while reporting the findings of the study. As written earlier, the desire to be comprehensive and complete in data analysis always leads to over computation, specially when computer services were available. Therefore, in reporting the findings, a process of careful

selection is always present - not all the computations are relevant or meaningful, and need not be reported. Only the relevant meaningful and sought-for findings have been reported in the following pages. However, since the Report has also to serve as a bench-mark survey of some sort, attempt to be fairly comprehensive in coverage was not curbed, with the result that the size of the Report has become quite bulky.

Chapter 9

THE SETTING : THE UNIVERSE AND THE SAMPLE

There could be a number of reasons for entrusting the Department of Psychology and Education of the Gandhian Institute of Studies, Varanasi with the task of participating as a collaborator in this nation-wide study, only some of which are implicit in the introductory chapters of the report. The main concern of this chapter, however, is to provide a brief description of the essential geographical-ecological setting of the district of Varanasi, to show how far the sample had been able to capture its essential characteristics. Such a description will provide some insight in the processes that influence the social and cultural norms of the area.

Varanasi is a large, populous district of Uttar Pradesh. It bounds an area which is shaped somewhat like right angled boomerang. Its major axis is in the east-west direction along the river Ganga, but the district is on the north side of the river only. (See map). Towards the eastern end it stretches across the Ganga and the district boundary bulges towards the south. Chakia and Chandauli tehsils occupy thus the eastern and south eastern part of the district. Sadar and Gyanpur, occupying the western side of the district, are usually in the north side of the river Ganga. From one extreme on the west, to the south-eastern tip of the district which is contiguous with Bihar, the distance will be more than 150 kilometers. The Chakia tehsil is hilly, but the remaining three tehsils are level.

Varanasi city, also popularly known as Kashi, is one of the holiest of all Hindu pilgrimage centre in India. It is a very ancient town, even by world standards. No other thriving town in the world has such a continuous history from very olden times. It is said that it was a thriving town during Manu's time - and had a reputation as a great seat of learning and religion during Buddha's time, 500 years before Christ. It is situated on the river Ganga, 800 Km. from Delhi and 650 Km. from Calcutta. This city is one of the KAVAL towns of Uttar Pradesh (KAVAL towns consist of Kanpur, Allahabad, Varanasi, Agra and Lucknow), which happens to be the largest province in the country in terms of population. It is the junction of mighty trunk routes - rail, road and air - of northern India. Mughal Sarai, the huge railway junction, having the largest marshalling yard in Asia, is only 19 Km. on the eastern side of Varanasi city, across the river. Ganga used to be a flourishing water-way, now in disuse - but she may regain her importance for riperine transport, in the context of the present world crisis of oil and power shortage. Even seventy years back, considerable quantity of

freights used to be carried upto Kanpur, from Bengal and Bihar, through the Ganga.

There is a considerable body of literature, produced both by Indian and foreign authors, on various aspects of Varanasi - antiquity, history, and religious traditions appropriating a major share. There is a view which traces the origin of the city to pre-historic, pre-Aryan days. The British art critic and historian Havell had put forward this view, based upon geo-morphological considerations of the Ganga at Varanasi. Even though it is largely the alluvial plane of the river basin on which the city is constructed, yet, it appears that a submerged hard rock formation on the western side of the river - on which the city is founded, successfully prevented the river from changing its course or shifting its main channel towards the west. Havell thought that the magnificent arc-shaped amphitheatre that the Ganga formed here, giving an unobstructed view of the rising sun to the east across the river, attracted the pre-Aryan residents of India to settle here. During the pre-Vedic and Vedic periods great cities in northern and north-western India were flourishing on mighty rivers, or confluences of rivers. Saraswati was one such river on which flourished many propsperous cities during the Vedic times. But shifting of the course of rivers caused many cities to ruin; Mohan-jo-daro, and cities on the dry Saraswati river bed in Rajasthan (like Kalibangan) are striking examples of such ups and downs in the life of cities.

Varanasi is situated within the confines of three rivers - river Assi joining the Ganga on the south, and river Varuna on the north, forming a sort of open rectangle within which the old city was situated. When the Aryans invaded north India, they found Varanasi a prosperous settlement. The river Varuan was a big and important river in those days, and certain ancillary settlements were established along the Varuna, and specially at the confluence of Varuna and Ganga - which is called the Kilah (Fort), as artheological excavations have revealed the existence of a town which was flourishing during the time of Buddha.

Despite vagaries in the flow of water in the Assi (which is almost dried up), and Varuna, Varanasi has continued to have an unbroken history, due to the stable geo-morphological structure on the Gangetic bank. Thus Varanasi happens to be one of the few ancient cities in the whole world, which has an unbroken history since pre-Aryan days. The pre-eminence of Varanasi is one of the most important Hindu pilgrimage centres, and perhaps the most dominating centre of Sanskritic, specially, Vedic learning, has continued even today.

In no other city in India, such close juxtaposition of the ancient with the modern is to be found. The age-old cottage industries like making of world famed Varanasi bracades, brass-ware, stone-ware and wooden ware, is now pitted against their modern competitors- backed by the forces of industrialization, and urbanization. The city still retains some of its leadership in the field of traditional culture and education. There are three universities - the Banaras Hindu University, the Varanasaya Sanskrit Visvavidyalaya and the Kashi Vidyapith - engaged in imparting three distinct types of education. The district is known for its political awareness. So much so, that three chief ministers of the state, and one Prime Minister of India have owned their origin to Varanasi.

Varanasi had a rich agricultural hinterland toward the west side which catered to its urban needs. Due to rapid urbanization, this agricultural hinterland is fast receding - the city is tending to make encroachments into areas which were farm lands even a decade or two back. These ecological developments are post-independence phenomena.

As pointed out earlier, Varanasi is a thorough admixture of the old and the new, of the developed and the undeveloped, of the traditional and the modern. In sum Varanasi happens to be one of the backward districts of eastern Uttar Pradesh. The per capita income of the district has been known to be lower than the national average of Rs. 346/- per year. It has been said that this state of economic stagnation may be largely due to the lack of concrete and concerted efforts towards improving the conditions of the rural people of the district. Politicization of development schemes, absence of irrigation facilities, illiteracy, unemployment, inadequate and improper exploitation of human resources are some of the factors which have contributed towards making the district a backward and poor district forcing the majority of people to live in distress and in the fringe of poverty over the centuries.

Demographic features of Varanasi District

The ultimate value of the findings of the modern empirical research, in the field of social sciences, depends to a large extent upon the range of its generalizability to the general population, samples from which have been studied thoroughly. This generalizability is a function of the representativeness of the sample in terms of the population from which it has been drawn. Therefore, we should have some knowledge of the demographic characteristics of the entire district of Varanasi, which forms the universe of discourse so far as this study is concerned.

Table 9-1

Demographic Characteristics of Varanasi District

Location	Upper Caste Male	Upper Caste Female	Upper Caste Total	Schedule Castes	Scheduled Tribes	Total
Urban	393248	322526	715774	61531	146	778451
Rural	1100990	1034695	2135685	436164	130	2571979
Total	1494238	1358221	2852459	497695	276	3350430

Several points are worthy of note in Table 9-1 :

1. The proportion of scheduled castes in the urban areas is 8%, but the same in the rural area is about 17%, that is, more than double.

2. There is a microscopic sprinkling of scheduled tribes also in the district (276 in the entire district); however, strangely enough, more scheduled tribes are to be found in the urban areas than in the rural areas.

3. The proportion of females in the urban areas is only about 45% compare to more than 48% in the rural areas - this figure is only for the upper castes, and scheduled castes and scheduled tribes are excluded from the computation.

There are four revenue subdivisions or tehsils in the district. The population break-down in these four revenue subdivisions is shown in Table 9-2.

Table 9-2

Break-down of population in four revenue subdivisions of the district

Subdivision	Caste groups: Upper Castes	Scheduled castes	Scheduled tribes	Total
1. Gyanpur	537307	118871	59	656237
2. Sadar	1530474	197905	214	1728596
3. Chandauli	611304	12[illegible]156	3	740460
4. Chakia	173374	51763	–	225137
Total	2852459	497695	276	3350430

It will be noted that the populations in the Varanasi Sadar subdivision is much bigger than the remaining three sub-divisions separately and even taken together. The densely populated city ofcourse accounts for more than half of the population of the sadar divisions.

The breakdown of the population of the district according to various religious groups has been shown in Table 9-3.

It may be noted that the proportion of non-Hindus in the country side is much less than in the urban areas. This applies to the Muslims also, though to a lesser extent. Again, compared to Hindus, and Muslims, the proportion of Christians, Sikhs, Buddhists and Jains is very small.

The three tables fail to underline the tremendous heterogeneity and variability of the population of Varanasi, specially when the city population is taken into consideration. There is such a thorough mixing up of the old and the new, the traditional and the modern, the religious and the secular, the spiritual and the technological, that it is one of the few old cities within the country which is truly cosmopolitan in nature. The life around the majestic ghats, and the old temples, maths and monasteries, and chatuspathis and pathshalas thrive side by side with the advanced sophistication in the Diesel Locomotive Works, the Power House and the Railway Station. In Varanasi cottage industries of the most intricate workmanship vie with modern precision instrument making - Varanasi manufacturers more precious scientific balances than any other place in the country. Because it is a great centre of pilgrimage, people from all over the country, even from abroad, make it their home. It is said that there are 100,000 Bangalis and 25,000 South Indians in the city, as permanent residents.

To reflect this heterogeneity in the sample of pupils to be drawn from a limited number of schools thus became a major concern of the sampling of schools from the city and the country. This is described on page no.115.

Table 9-3

Breakdown of population of Varanasi district according to religious status (excluding scheduled castes and scheduled tribes)

Religious Status	Urban Male	Urban Female	Urban Total	Rural Male	Rural Female	Rural Total	Entire District Male	Entire District Female	Entire District Total
1. Hindu	2.93 1	2.35 1	5.28 1	1037	9.75 1	20.13 1	13.3 1	12.11 1	25.42 1
2. Muslim	0.96 1	0.63 1	0.82 1	0.63 1	0.58 1	1.22 1	1.594 1	1.44 1	3.036 1
3. Christian	1239	1288	2527	138	104	242	1377	1392	2769
4. Sikhs	1784	1099	2883	29	32	81	1833	1131	2964
5. Buddhists	102	21	123	32	32	64	134	53	187
6. Jains	466	344	810	65	40	105	531	384	915
7. Not stated	6	11	17	–	–	–			
							6	11	17
	3.932 1	3.235 1	7.167 1	11.000 1	10349 1	21.36 1	14.94 1	13.58 1	28.52 1

1 = lacs

Selection of Schools

Selection of Schools

The total number of primary, junior and higher secondary schools (having primary sections) in Varanasi is about 2000; where children including those of 5½ to 11 years of age, are getting education. These schools belong to different types of management: government, government aided, and private, unaided or aided. The principle of multistage stratified sampling was followed in the selection of schools, and then the subjects from the selected schools. In the different strata, proportionate probability sampling was used.

One point has to be emphasized at this stage. The character of rural-urban base, sex composition of the pupils enrolled in the schools, size of the school-small medium, or large - and type of management - government aided or private - all these had to be preserved in the sample of schools to be studied. But it was also decided that the proportion of subjects in the three subsamples of schools, one drawn from the urban area and the other from the rural area would not be as in the entire district, but will be equal, and will be about 300 for both the sets of schools. This was a decision taken in the meeting of the Honorary Project Directors held in Bangalore in 1970.

If the proportionality were to be maintained, there should have been about 70% subjects drawn from rural schools, and 30% subjects drawn from the urban schools. Instead, about 300 subjects were to be drawn from each of the two sets of schools, urban and rural.

First Stage

First of all the names of all primary schools, and junior and higher secondary schools having primary sections, were obtained from the offices of the Zilla Parishad, Corporation, District Inspector of Schools, and Regional Inspectress of Girls Schools. Later some of the schools were visited by the project team, to ensure that the correct enrolment figures have been obtained from them. The strength of enrolment in each grade was noted from the enrolment register provided by the Head Masters of the schools, and these were then verified from the attendance registers.

Usually the attendance figures for any three days in the month were averaged, and then added to obtain the overall strength of enrolment of the schools. This was an important caution. It has been alleged that in many schools the number of children shown in the attendance registers is artificially inflated, by entering fictious names, in order to maintain a bigger staff in the school. On the other hand, instances

were not rare, where many children sat in the classroom,(Generally in Grade I) who were not enrolled at all. Such artifacts had to be eliminated to obtain the correct position with regard to enrolment.

The long list of the primary, middle and high schools, from the urban area, or from the rural area was rearranged on the basis of type of management (government, aided and private). Then the schools were again categorized according to size of enrolment as large (L), medium (M), and small (S), according to the following criterion :

1. Enrolment in Grades I to V exceeds 400-Large (L)
2. " " " is between 200-377-Medium (M)
3. " " " below 200-Small (S)

The distribution of all the schools acc... g to this multi-category principle is shown in Table 9-4.

It will be seen that the number of schools in rural and urban areas together is 1603, which is at variance with the total number of 2000 mentioned earlier. The reason for this difference should be mentioned. There is a large number of private Urdu (Maqtabs) and Sanskrit (Pathashalas) schools in this district, which are outside the general educational stream of this state. Some of these schools are seasonal or irregular, or exist in name only; some are privately endowed - its existence is a fact, but it functions outside the recognised forms of the educational system. Such schools cannot be listed accurately. So it is safer to exclude them from the master list.

Management	Large			Medium			Small			All Sizes		
	Boys & Co. Educ.	Girls	Total	Boys & Co. Educ.	Girls	Total	Boys & Co. Educ.	Girls	Total	Boys & Co. Educ.	Girls	Total
Urban												
Govt.	4	1	5	1	-	1	-	-	-	5	1	6
Aided	45	3	48	45	13	58	64	42	106	154	58	212
Private	1	-	1	6	-	6	19	-	19	26	-	26
Total	50	4	54	52	13	65	83	42	125	185	59	244
Rural												
Govt.	6	4	10	4	1	5	-	-	-	10	5	15
Aided	20	-	20	256	-	256	958	64	1022	1234	64	1298
Private	-	-	-	-	-	-	46	-	46	46	-	46
Total	26	4	30	260	1	261	1004	64	1068	1290	69	1359
Urban & Rural Total	76	8	84	312	14	326	1087	106	1193	1475	128	1603

Second Stage

Keeping in view the limitations imposed by the duration of the project, and budgetary provision for carrying out the study, the Project Directors had decided that each centre should select about 30 schools - 15 each from urban and rural areas, and about 20% of pupils enrolled in each of the three grades (Grades I, II and V), which could give a total sample of 600 to 700 for each centre. These 31 schools should be representative of the universe of schools, that is - be representative of all schools in terms of size, sex composition and type of management. Efforts should also be made to ensure that sufficient number of girls are chosen in the sample.

Within each cell of the type of school, representing various combinations of size, management, and sex composition, randomization was used for selecting a fraction of the schools, having the same proportion as the cell to the entire universe. The procedure that was followed is described below.

The list of urban schools was taken first. First, all the L schools were serially listed, numbering from 1 to 54, next all the M schools were serially listed, numbered from 65 to 125, and then the S schools were listed numbered from 125 to 251 starting from the government through aided to private schools. As explained earlier, selection of the schools from each category was based on the principle of equal probability of being selected in the final sample, even if the total numbers of schools in the large and medium categories were only about of the third, that is small, category. In other words, as required by the principle of equal probability, the intention was to select (L) and (M) schools in such a way that all (L) and (M) schools got twice as much chance of being selected as the (S) schools.

For this purpose, another list in which each (L) and (M) school occurred twice was prepared. The list was somewhat like this:

New Serial No.	Actual Serial No. of School	
1		
2	1	
3	1	
4	2	
5	2	
-	3	L(arge) Schools
-	3	
-	4	
	4	
	-	
	-	
109		
110	55	
111	55	
-	56	
	57	M(edium) Schools
	-	

New Serial No.	Actual Serial No. of School	
251	126	
252	127	
253	128	
-	-	
-	-	S(mall) Schools
-	-	
361	251	

This long list was not really necessary, and would have been virtually reduced to 54x2+65x2+125x1 = 363 schools, out of which 15 schools had to be chosen. Since 363 ÷ 15 = 24.2, it means, every 24th school could be chosen, once the first number from 1 to 24 was chosen strictly randomly. The serial number of the first school chosen randomly happened to be 20. Therefore, the schools bearing the serial number 44, 64 etc. were chosen, until 15 schools had been chosen in this manner.

A similar method was followed for drawing sample rural schools. In this case, the total number of schools selected was 16, rather than 15. Sample attenuation was supposed to be greater in the rural schools, due to relatively greater drop-outs, hence the sample size was sought to be increased somewhat.

The distribution of schools in the final sample, on the basis of the various selection variables has been shown in Table 9-5.

It will be seen that in the 31 schools constituting the final sample, certain types of schools are not represented at all, if too specific combination of school factors is considered. But, taking the sample universe as a whole, both school size and management characteristics of the universe have been captured in the sample to a great extent. This is also largely true of the sex composition of schools boys, coeducational, purely girls schools etc.

Table 9-5

Distribution of schools in the final sample on the basis of location, size, sex composition & management

Management	Large			Medium			Small			All Size Together		
	Boys & Co. Educ.	Girls	Total	Boys & Co.Educ.	Girls	Total	Boys & Co.Educ.	Girls	Total	Boys & Co.Educ.	Girls	Total
Urban												
Govt.	1	–	1	–	1	1	–	–	–	1	1	2
Aided	2	–	2	2	1	3	3	2	5	9	3	10
Private	2	–	2	1	–	1	–	–	–	3	–	3
Total	5	–	5	3	2	5	3	2	5	13	4	15
Rural												
Govt.	–	1	1	–	–	–	–	–	–	–	1	1
Aided	2	–	2	3	–	3	7	2	9	12	2	14
Private	–	–	–	1	–	1	–	–	–	1	–	1
Total	2	1	3	4	–	4	7	2	9	13	3	16
Urban & Rural Total	7	1	8	7	2	9	10	4	14	26	7	31

Third Stage

In the third and last stage of sampling pupils had to be chosen from each of the three grades in each school. The population for each grade in each school became only those students whose age, as recorded, and as far as could be verified to be reasonably true, fell within the age range of $5\frac{1}{2}$ to $6\frac{1}{2}$ years for grade I, $6\frac{1}{2}$ to $7\frac{1}{2}$ years for grade II, and $9\frac{1}{2}$ to 11 years for grade V. Younger and older students had to be excluded. Then out of this list, usually 6,7,8 students would be selected by using a table of random numbers. The number had to be kept on the large size for these reasons: (i) some of the students initially selected in the sample might be absent on that day, (ii) to absorb the inevitable attenuation in the sample that would occur as the testing had been phased out to stretch over an year.

In this way the final sample consisted of 680 pupils chosen from 31 schools from the rural and urban areas. After sample attenuation, this number was further reduced to 603 pupils for which complete testing and other relevant data were available. That became the final sample upon which this study is based.

[redacted]

6. <u>Teacher Qualification</u>

Three categories are proposed to be used-poor
Average
Good

CHAPTER 10

Characteristics of School Sample

In this chapter we propose to describe the schools that were chosen for the present study. It has already been made clear that the 15 schools chosen from the city corporation limit of Varanasi, and 16 schools chosen from the rural areas of the entire district of Varanasi were intended to be as representative of the universe of all schools of the district as possible. Schools could vary along a host of dimensions. A truly random sample of schools would be representative of these dimensions also-that is, the type of variability and central tendency that characterize the universe, will also be present in the sample, within the permissible range of chance errors.

The variables that were chosen for special attention are:

1. <u>School Management</u>

The management may be vested with the government, or local bodies; it could be privately managed, receiving aid from the government or local bodies; or it could be privately managed, receiving no aid either from the government or local bodies.

2. <u>School Composition</u>

The school could be a purely boys' school, a purely girls' school or it may be coeducational.

3. <u>School Size</u>

Three categories of size have been used to describe the size of the schools:

Small - Number of children upto 200
Medium - Number of children between 200 to 399
Large - Number of children 400 or more

4. <u>Shift system</u>

The school could have a single shift system or a double shift system.

5. <u>Medium of Instruction</u>

This could be Hindi or English

6. <u>Teacher Qualification</u>

Three categories are proposed to be used-poor
Average
Good

7. Teacher-pupil Ratio

Here too, three categories are proposed to be used-poor
Average
Good

8. School facilities and Equipment

Here also, three categories are proposed to be used-poor
Average
Good

Of these eight variables only the last three, which are more purely saturated with pure academic loading may be called 'educational' variables, in that we know what is meant to be good, and what is meant to be bad, in terms of some overall or composite dimension like "excellence of schooling". We expect that a school where the teachers are highly qualified; where there is a low teacher-pupil ratio-so that students may get individual attention; and where there are a lot of educational aids and accessories and extracurricular activities,-the overall educational function and educational impact of that school will be considerable. Such clearcut categorical statements cannot be made about the first 5, purely nondirectional, qualitative, administrative variables, whose academic-instructional impact is likely to be unclear. In fact, with those administrative variables, no clearcut trend is known to exist, nor can be surmised on logical grounds with regard to their educational effectiveness. For example; are private, unaided schools, better, worse or equal, in general to government schools? Are coeducational schools better or worse than one-sex schools? Which school is better-the large, medium or small? Wide variability appears to be the rule if we try to relate these variables to excellence of schooling. Later, we may try to tackle with the question, and see if we can tease out how these variables have actually 'behaved' with regard to school performance by the sample children. However, at first let us consider what characteristics these sample schools possess with regard to these chosen eight variables.

Characteristics of Sample Schools: Administrative Variables

How the 15 urban schools, and 16 rural schools, are distributed in terms of the different categories for each of the five administrative type of school variables, has been presented in Table 10-1.

Table 10-1

Distribution of sample schools according to five administrative school variables

Administrative school variable	Number of — Schools Urban	Rural	Total
1. School Management			
(a) Govt. and Local Bodies	11	15	26
(b) Private, aided	1	0	1
(c) Private, unaided	3	1	4
2. Sex Composition of pupils			
(a) Boys school	2	0	2
(b) Girls school	4	3	7
(c) Co-educational	9	13	22
3. School size			
(a) Large	5	2	7
(b) Medium	5	4	9
(c) Small	5	10	15
4. Medium of Instruction			
(a) Hindi	14	16	30
(b) English	1	0	1
5. Shift system			
(a) Single shift	11	16	27
(b) Double shift	4	0	4
Total	15	16	31

Some of the more striking trends shown in Table 10-1 may be commented upon.

First, it will be seen that by and large, an overwhelming majority of the schools are managed by governments or local bodies, such as municipalities or zilla parishads. Again, in the city corporation area, the proportion of private, aided and private, unaided, schools is somewhat greater than that in rural areas.

Along with this fact, we may also note that with the exception of one lone school, which is managed by the Christian Missionaries, and is situated within the posh campus of the Central Government owned Diesel Locomotive

works, all the remaining schools have Hindi as their medium of instruction. In the regular primary school system of Uttar Pradesh, English is not introduced-officially until grade VI.

The third point to be considered along with this, is that all the 16 schools in the rural areas, and 11 out of 15 schools in the urban area, are single shift schools. Only four schools of the urban sample have double-shift, necessitated by pressure of accommodation. Usually, when the same building is used for both primary and middle and/or even higher grades, the school adopts the two-shift system. This is not a serious problem in the rural areas, where, classes may be, and are, held outside class-rooms, if there is any demand on scarce accommodation.

There is some variation with regard to the sex composition of pupils of the sample schools. In the city sample, there are two purely boys schools, against four purely girls' schools. The remaining nine are co-educational schools. In the rural sample of schools, there are no so-called purely "boys" school, but there are three "girls" school. There are thirteen co-educational schools in the rural sample. In reality, all of these thirteen schools have only a sprinkling of girl students.

With regard to size of the school, there is considerable variation, relatively more among the urban sample of schools than among the rural sample of schools. There are equal number large, medium and small schools in the urban sample of schools. Among the sixteen rural schools, only two are large four are medium sized, and ten are small-sized, as defined by us, for this study (Less than 200 small; between 200 to 400 medium; more than 400 large).

Administrative Typology of Sample Schools

If all the five administrative variables are considered together with 3 categories within each of the first three administrative variables viz. school management, sex composition, and school size, and 2 categories within each of the last two variables, viz., medium of instruction, and shift system, theoretically 108 different combinations are possible. With only 31 schools in the sample, there will naturally be no schools for particular combinations of categories of 5 variables, and there will be concentration among certain combinations more than among others.

By going back to the definition of the concept of "type", we note that it represents of combination of characters, traits, ingredients or elements, drawn from disparate sets. When we are considering the five administrative schools, variables, each of which has either 3 or 2 levels, any possible combination of any one level of each of the five variables present in a particular cluster will represent a distinctive 'type'. This idea can be best illustrated systematically by giving distinctive symbols to the different levels of each of the five administrative variables thus:

1. <u>School Management</u>

Government or Local Bodies	A_1
Private, aided	A_2
Private, unaided	A_3

2. <u>Sex composition</u>

Boys school	B_1
Girls school	B_2
Coeducational	B_3

3. <u>School size</u>

Large	C_1
Medium	C_2
Small	C_3

4. <u>Medium of Instruction</u>

Hindi	D_1
English	D_2

5. <u>Shift system</u>

Single shift	E_1
Double shift	E_2

Various combinations of A, B, C, D, and E levels are theoretically possible. In fact with A, B and C each having 3 levels, and D and E having two lebels each, there are altogether 108 possible combinations or types.

Actual analysis of the characteristics of the sample schools shows that there were only 12 distinct types present in this sample. The identification number of schools belonging to the 12 ~~different types have been~~ shown in Table 10-2

Table 10-2

Identification Numbers of the sample schools belonging to twelve district administrative types

No.	Symbolic School type Combination	Components	ID No. of schools Urban	Rural	No. of Schools
1.	$A_1B_2C_2D_1E_1$	Govt./Local body-Girls Medium-Hindi medium Single shift	03	-	1
2.	$A_1B_1C_3D_1E_1$	Govt./Local Body-Boys Small- Hindi medium single shift	10	-	1
3.	$A_1B_2C_1D_1E_1$	Govt./Local Body-Girls Large-Hindi medium single shift	-	17	1
4.	$A_1B_2C_2D_1E_2$	Govt./Local Body-Girls medium- Hindi medium Double shift	08		1
5.	$A_1B_2C_3D_1E_1$	Govt./Local Body-Girls Small- Hindi medium single shift	-	16,21	2
6.	$A_1B_2C_3D_1E_2$	Govt./Local Body-Girls Small- Hindi medium Double shift	11,15	-	2
7.	$A_1B_3C_1D_1E_1$	Govt./Local Body-Coeducational- Large-Hindi-single shift	04,12	10	3
8.	$A_1B_3C_1D_1E_1$	Govt./Local Body-Coeducational- Medium-Hindi medium- Single Shift	05,07	18,24,27	5
9.	$A_1B_3C_3D_1E_1$	Govt./Local Body-Coeducational- Small - Hindi- Single shift	06;13	22,23,25,26, 28,29,30,31	10
10.	$A_2B_1C_1D_1E_1$	Private aided- Boys-large-Hindi- Double shift	09	-	1
11.	$A_3B_3C_1D_1E_1$	Private unaided - Coeducational - Large Hindi medium- Single shift	01	-	1
12.	$A_3B_3C_3D_2E_1$	Private unaided- Coeducational - Large-English medium-Single shift	14	-	1
13.	$A_3B_3C_2D_1E_1$	Private unaided- Coeducational- Medium-Hindi medium- Single shift	02	20	2
	Total		15	16	31

It will be seen from Table 10-2, that undoubtedly the modal type is $A_1\ B_3\ C_3\ D_1\ E_1$ - it is a government/ local body managed, co-educational, small sized, Hindi medium, single shift school. Nearly one-third of all schools belong to this type. Again, it is also clear that, with the lone exception of a single English medium school (# 14,urban), the remaining thirty are Hindi medium schools. Further, there are only 4 schools (# 08, # 11, # 15 and # 09) which have double-shift system. All of them are in urban areas. Lastly, in the entire sample of 31 schools, only 4 (# 01, # 14, # 02, and # 20) which were privately managed, are unaided schools; another school (# 09) was a private aided school.

We may then conclude that by and large the typical primary school in the Varanasi district is the government or local bodies managed, single shift school with Hindi as the medium of instruction. A majority of these schools is small sized, and there are slightly more coeducational schools than schools catering to the needs of only one sex.

It may be that the major importance of an exercise of the type denoted by facts summarized in Tables 10-1 and 10-2 is in providing of profile of the administrative setup of the primary school system in the district of Varanasi. This may not be the place to dwell upon the sociological, planning or educational implications of the typology of the primary school system of the district of Varanasi. Just to cite one instance, in the entire sample of 31 schools, there are only two schools (# 03, # 08), which are meant exclusively for boys. As against this, there are seven schools meant exclusively for boys. As against this, there are seven schools, where both girls and boys have access. Thus on paper at least, schooling opportunity for girls cannot be called meagre so far as Varanasi district is concerned.

Next, we can turn our attention to the sample schools in terms of what may be called instructional efficiency.

Excellence of Academic-Instructional Characteristics of Sample Schools

The three objective scales used for measuring the quality or excellence of the academic-instructional characteristics of the schools have been described earlier. The three scales are

1. Teacher Qualification
2. Teacher-pupil ratio
3. Instructional facilities and equipment.

The objective scores obtained by applying each of the scales to any school could be converted into three ratings, Good, Medium and Poor. The distribution of the sample schools in terms of the ratings obtained in these three academic-instructional excellence measuring scales is shown in Table 10-3.

Table 10-3

Distribution of ratings on three scales measuring excellence of academic-instructional facilities among the sample schools

Scale	Number of Poor	Schools Average	Obtaining Good	Ratings of Total
I. Teacher Qualification				
Urban	4	7	4	15
Rural	3	12	1	16
Total	7	19	5	31
II. Teacher-Pupil Ratio				
Urban	0	9	6	15
Rural	6	10	0	16
Total	6	19	6	31
III. Facilities and Equipment				
Urban	6	6	3	15
Rural	13	1	2	16
Total	19	7	5	31

Perusal of Table 10-3 will point to a few interesting things:

1. In the matter of teacher-qualification, the urban schools have some edge, just <u>some</u>, over the rural schools.

2. In the matter of teacher-pupil ratio, the urban schools have a definite edge over the rural schools.

3. This is even more pronounced, when we come to "facilities and equipment"; the majority of the rural schools are poorly equipped and have poor facilities.

<u>Typology of schools in terms of academic-instructional excellence rating</u>

If a rating of 1 is given to 'poor', 2 to 'Average' and 3 to 'good' ratings, for each of the three academic-instructional facilities scale ratings, then for each school we can

obtain a composite rating, by combining the ratings from the three separate scales. The composite rating will range from a minimum of 3 to a maximum of 9. The distributions of the composite ratings for urban, rural and all schools together are shown in Table 10-4

Table 10-4

Distribution of School Excellence Category Scores for sample schools

Excel-Category	Urban Frequency	Schools percent	Rural Frequency	Schools Percent	All Schools Frequency	Percent
3	0	00.00	2	12.50	2	06.45
4	1	06.67	4	25.00	5	16.13
5	5	33.33	7	43.75	12	38.71
6	3	20.00	2	12.50	5	16.13
7	3	20.00	1	06.25	4	12.90
8	2	13.33	0	00.00	2	06.45
9	1	06.67	0	00.00	1	03.23
	15	100.00	16	100.00	31	100.00

The distribution of school Excellency Category Scores-(this expression which is brief and neat will be used" rather than the lengthier and more cumbersome "academic - instructional excellence" category score) for urban and rural schools is quite interesting. The distribution of the scores is more symmetrical for rural schools than that for the urban schools. The distribution is more positively skewed for the rural schools, and it is also more peaked. If the distribution of the scores for urban and rural schools taken together is considered, it will be seen that it is very peaked, the modal score being 5, which shows the slight but definite skew towards the positive end.

Validity of the School Excellence Variables

How far excellence of schooling contributes to the acquisition of certain skills in language and mathematical operations is one of the major concerns of the present study. Therefore it has all along been felt that there should be some sustained effort to find a satisfactory, psychometrically valid scale for measuring the position of each sample school on the dimension of "excellence of schooling"- in terms of academic, curricular, staff, and extra curricular facilities and equipments. Naturally a question arises.

how valid is the categorization of schools in terms of their scores in the three "excellence of schooling" variables, viz., teacher qualification, teacher-pupil ratio, and facilities and equipments of the school in question? To find some sort of an answer to this question, the fifteen schools of the city area and the sixteen schools of the rural area, were ranked by three research investigators who had visited each of these schools at least three times, but usually more times than three. Thus all the three investigators had first hand and quite intimate acquaintance with the schools - they had formed a vivid impression of each school, and had shared some sort of a common frame of reference. They independently ranked each school in terms of their "overall excellence". These global ranks for each school was averaged over the three sets of ranks given by the three judges. This is the criterion, against which the validity of each of the three objective school excellence variables could be estimated. We may recall that the original objective scores from each of the three variables were obtained in form ratio scale scores. (By using cut-off points in each scale, the scores were converted into ratings like A, B and C). The validity coefficient of each of the three objective variables could be found out by correlating each of them with the criterion score or "average global school excellence". But before the validity coefficients are presented, we should see how reliable the global rankings given by the judges are. This is very easily found out by correlating the ranks given by pairs among the three judges. These inter-judge rank correlations are shown in Table 10-5.

Table 10-5

Rank Difference Coefficients of Correlation between global ranks of school excellence given to school by three judges

Correlation between Ranks given by	Urban Schools (N=15)	Rural Schools (N=16)
Judges I and II	.895	.822
Judges I and III	.952	.641
Judges II and III	.877	.621

Table 10-6

Pearson product moment coefficients of correlation among three objective 'school excellence' variables and a criterion variable of 'school excellence' rank

Variables	Urban Schools I Teacher qualification score	II Teacher pupil Ratio Score	III Facilities and equipments Score	IV Global school excellence Rank (criterion)		Rural Schools I Teacher qualification score	II Teacher Pupil Ratio Score	III Facilities and equipments Score	IV Global school excellence Rank (criterion)
Teacher qualification score	-	-.305	.750	-.627	I Teacher qualification score		-.164	.603	-.430
Teacher pupil Ratio Score	-	-	-.161	-.123	II Teacher pupil Ratio score		-	-.294	.479
Facilities and equipments score			-	-.673	III Facilities and equipments score			-	-.578
Global School excellence Rank (Criterion)				-	IV Global School excellence Rank (Criterion)				-

It will be seen that the inter-judge agreements for global school excellence variables are higher for urban schools, but somewhat lower for rural schools.

The validity coefficients of each of the three variables were calculated by the product-moment method. These correlations are shown in Table 10-6. In this table the inter-correlation between the three variables are also shown.

A perusal of the correlations reported in Table 10-6 shows the validity coefficients indeed are very disappointing. There are two possibilities. Either the global ratings given by the judges are not very valid or relevant. The other possibility is that the three objective measures themselves are not very valid, or else they are measuring something which is different. The inter-correlation among the three objective measures, however, are all along expected directions. Therefore, it will not be safe to jump/to the conclusion that the objective measures are invalid.

In subsequent data analysis, these three measures may be used as a separate and additional measure of school excellence. The two need not be mixed together.

Distribution of subjects undergoing different levels of excellence of schooling

Before we close this section, it may be interesting to examine what is the nature of the distribution of subjects undergoing differential impact emanating from differences in teacher qualification, teacher-pupil ratio, and school facilities and equipment.

The three distributions of subjects undergoing differential impact have been shown in the same table, viz. Table 10-7.

Table 10-7

Distribution of subjects undergoing different types of educational impact from their teachers and schools

Category of Impact	Source of Impact: Teacher qualification	Teacher-Pupil Ratio	Facilities and Equipment
Poor	127	130	343
Average	365	357	149
Good	111	116	111
Total	603	603	603

It will be noted that whereas, in terms of teacher qualification, and teacher-pupil ratio, there is some sort of balance in the distribution between poor, average and good, this is not so for "facilities and equipment" in which more than half (56.8%) of the children are drawn from schools which are poor in terms of school facilities and equipment.

Next, we can look into the same phenomena of differential academic- instructional impact undergone by the students separately, we can take the composite measures into consideration.

In Table 10-4 in the last column are shown the frequency distribution of schools rated as having different "school excellence category" scores, ranging from a minimum of 3 to a maximum of 9. In Table 10-8, this portion of the distribution is reproduced, along with the number of students sampled from those schools belonging to each category score.

Table 10-8

Frequency distribution of schools belonging to different "school excellence" categories, and size of sample of children drawn from them.

School Excellence Category Score	No. of Schools	percent	No. of Subjects	percent
3	2	6.45	38	6.3
4	5	16.13	87	14.4
5	12	38.71	212	35.2
6	5	16.13	118	19.6
7	4	12.90	78	12.9
8	2	6.45	51	8.5
9	1	3.33	19	3.1
Total	31	100.00	603	100.00

The close correspondence between the proportion of schools belonging to each category of "school excellence", and the proportion of pupils drawn as samples from them is remarkable. This vouches for the representative nature of both the school sample as well as of the pupil sample.

CHAPTER 11

CHARACTERISTICS OF THE RESPONDENT SAMPLE OF SCHOOL CHILDREN

Just as in the previous chapter, the sample of 15 urban schools and 16 rural schools has been described in terms of five administrative school variables, and three academic - instructional excellence variables. In this chapter, the actual respondent sample of 301 urban children and 302 rural children drawn from those 15 urban schools and 16 rural schools respectively, will be described. However, the sample of respondents has to be described in terms of the entire set of variables which have been brought under the class of independent, antecedent or background variables. Certain meaningful combinations of these variables has to be made to prevent too much of atomization of the group characteristics inherent in the various distributions.

I. Sex-distribution among different school samples of respondents

The number of boys and girls in each sample of children drawn from each of the three grades I, II and V, of course varied widely from school to school. This distribution for the urban schools has been shown in Table 11 - 1.

One point of interest in Table 11 - 1 is that among the 15 urban schools studied, 4 are exclusively girls schools, and two are exclusively boys schools, as indicated by the profixes G and B respectively. In the remaining 9 co-educational schools, the proportion of boys to girls is 48:14 in Grade I, 40:22 in Grade II, but 51:8 in Grade V. We can return to this interesting sex factor in the enrollment pattern as one goes from lower to higher grades, when we have covered the respondent sample in the 16 rural schols.

The number of boys and girls in the three grades in the sample of respondents drawn from the 16 selected rural schools are shown in Table = 11-2

Table 11 - 1

Number of boys and girls in the grade-wise samples drawn from urban-schools

S. No. of School	Grade I Male	Grade I Female	Grade I Total	Grade II Male	Grade II Female	Grade II Total	Grade V Male	Grade V Female	Grade V Total	All Grades Male	All Grades Female
01	5	1	6	2	4	6	4	3	7	11	8
02	5	4	9	3	5	8	6	1	7	14	10
G03	0	6	6	0	7	7	0	6	6	0	19
04	8	0	8	5	2	7	6	1	7	19	3
05	3	1	4	6	1	7	5	0	5	14	2
06	7	1	8	6	0	6	5	0	5	18	1
07	3	2	5	6	2	8	7	0	7	16	4
G08	0	9	9	0	3	3	0	8	8	0	20
[illegible]09	8	0	8	8	0	8	7	0	7	23	0
B10	10	0	10	9	0	9	7	0	7	26	0
G11	0	8	8	0	3	3	0	4	4	0	15
12	4	3	7	4	2	6	6	0	6	14	5
13	6	1	7	4	2	6	3	1	4	13	4
14	7	1	8	4	4	8	9	2	11	20	7
15	0	5	5	0	4	4	0	6	6	0	15
Total	66	42	108	57	39	96	65	32	97	188	113

Table 11 - 2

Number of boys and girls in the grade-wise samples drawn from rural school

ID No. of School	Grade I Male	Grade I Female	Grade I Total	Grade II Male	Grade II Female	Grade II Total	Grade V Male	Grade V Female	Grade V Total	All Grades Male	All Grades Female	All Grades Total
16	0	3	3	0	5	5	0	8	8	0	16	16
17	0	5	5	0	7	7	0	6	6	0	18	18
18	7	0	7	4	1	5	7	0	7	18	1	19
19	10	1	11	7	1	8	11	3	14	28	5	33
20	6	0	6	8	1	9	8	2	10	22	3	25
21	0	8	8	0	2	2	0	3	3	0	13	13
22	2	3	5	7	0	7	9	0	9	18	3	21
23	6	1	7	4	2	6	3	0	3	13	3	16
24	3	2	5	3	1	4	8	1	9	14	4	18
25	1	0	1	5	0	5	2	0	2	8	0	8
26	1	1	2	3	2	5	5	2	7	9	5	14
27	3	3	6	3	2	5	4	0	4	10	5	15
28	5	4	9	5	1	6	6	4	10	16	9	25
29	9	1	10	7	1	8	6	0	6	22	2	24
30	6	1	7	7	0	7	8	2	10	21	3	24
31	2	2	4	3	0	3	6	0	6	11	2	13
Total	61	35	96	66	26	92	83	31	114	210	92	302

Among the sixteen rural schools, three schools viz #16, #17 and #21 are exclusively girls schools. In the remaining 13 rural primary schools, the proportion of boys to girls is 61: 19 in Grade I, 66:12 in Grade II and 83:17 in Grade V.

The sex factor, in the enrolment pattern, as one goes from the lower grades to higher ones, is rather interesting, if we express the proportion of the females in the sample for each of the three grades as a percentage as shown in Table 11-3.

Table 11 - 3

Proportion of female students in the samples of respondents in three different grades

Location of Schools	No. of co-educational schools	N	Percentage of females in sample Grade I	Grade II	Grade V	Tot[al]
Urban	9	183	22.58	33.33	11.59	24.[illegible]
Rural	13	248	23.75	15.38	18.89	19.[illegible]
	No. of all types of schools					
Urban	15	301	38.89	40.63	32.99	37.[illegible]
Rural	16	302	36.46	28.26	27.19	30.[illegible]
Urban + Rural	31	603	37.74	34.57	31.28	34.[illegible]

It will be seen that, the over-all proportion of 34% girls i[n] the sample is made up of 37.54% of girls in the urban sample and 30.46% of girls in the rural sample. Secondly, it is note-worthy that, in the urban co-educational schools, in Grade II, the proportion of girls is as high as 33.33% compared to 22.58% in Grade I, but dwindles down to only 11.5[9]% in Grade V. But in rural schools, the reduction in the pro[-] portion of girls in the sample is less drastic: it goes dow[n] from 23.75% in Grade I, to 15.38% in Grade II to rise to 18.[89] in Grade V. If all types of schools in both urban and rural schools are considered together, we note that there is a re[-] gular and consistent decrease in the proportion of girls stu[-] dents in the samples starting at 37.74% in Grade I through 34.57% in Grade II to 31.28% in Grade V.

Before we close this section, it may be useful to provide a summary table giving the number of male and fe[-] male respondents for different grades in the r urban and rural sample schools. This is given in Table 11-4

Table 11-4

Number of boys and girls sampled from three grades in urban and rural schools

Grade I			Grade II			Grade V			All Grades		
Male	Female	Total	Male	Female	Total	Male	Female	Total.	Male	Female	Total
66	42	108	57	39	96	65	32	97	188	113	301
61	35	96	66	26	92	83	31	114	210	92	302
127	77	204	123	65	188	148	63	211	398	205	603
x^2= .13			x^2=3.18			x^2 = 0.86			x^2=3.37		

The proportion of subjects between rural and urban schools, from grade to grade, for both the sexes do not show any wide fluctuations. The Chi-square values for each of the four separate distributions are found to be too small to reach significance at even .05 level. This confirms the absence of any violent departure from proportionality of the distribution of the sexes among the three grade samples drawn from each of the sets of schools chosen from the urban and rural areas.

Now, we can consider the remaining variables in this category, one by one.

Description of the respondent samples in terms of Family Background variables

For purposes of facilitating data analysis at a later stage, no less than seven different separate variables were included under this very important class of factors considered to constitute what may be called 'family background'. These seven variables are:

1. Father's education
2. Mother's education
3. Father's occupation
4. Mother's occupation
5. Income
6. Religion
7. Caste

The distribution of each of these seven variables may now be described in that order.

<u>Father's Education and Mother's Education</u>

Eight different categories have been used to describe the status of the 'educational level' of the father, and the same categories have been used for describing 'educational level' of the mother. The frequency distribution of the 'educational level' of father of the sample of subjects, has been shown in Table 11-5. The distribution of 'educational level' categories among the parents of subjects drawn from the urban and rural schools, is quite revealing. First, let us note, that no less than 32.2% of the urban parents, and 30.8% of rural parents are illiterate. Both the urban and rural distributions are bi-model: the second mode is at the level of "primary school pass" for both urban and rural parents, though the percentage of the former is only 19.9 compared to 34.1 per cent for the latter. From above 'primary school pass' level the urban parents on the average are distinctlymore educated than the rural parents,

this becoming more pronounced as one goes to the higher levels of educational attainments. The proportions of 'high school pass' parents are more or less same (urban: 9.6%, rural: 10.3%) but from 'intermediate' and upwards, there are nearly 3 times more urban parents than rural ones.

Table 11 - 5

Frequency distribution of different categories of levels of education of father of subjects in the entire sample

Educational Level Category	Urban Frequency	per cent	Rural Frequency	per-cent	Total Frequency	Per-cent
1. Illiterate	97	32.2	93	30.8	190	31.5
2. Below primary pass	9	3.0	29	9.6	38	6.5
3. Primary school pass	60	19.9	103	34.1	163	27.0
4. Middle school pass	15	5.0	22	7.3	37	6.1
5. High school pass	29	9.6	31	10.3	60	10.0
6. Intermediate and special training	21	7.0	10	3.3	31	5.1
7. Graduate	36	12.0	10	3.3	46	7.6
8. Post-graduate and professional training	34	11.3	3.	1.0	37	6.1
9. Not known: not ascertained	0	0.0	1	0.3	1	0.2
Total	301	100.0	302	100.0	603	100.00

The chi-square value for the above distribution is found to be 68.85, which with 8 degrees of freedom is significant beyond .001 level, confirming a strong interdependence between urban-rural residence of parents and their educational level. We will return to this at a later stage.

The distribution of the 'level of education' categories for mother's education, likewise, has been shown in Table 11-6

Table 11- 6

Frequency distribution of different categories of levels of education of mothers of subjects in the entire sample

Educational Level Category	Urban Frequency	Urban Per-cent	Rural Frequency	Rural Per-cent	Total Frequency	Total Per-cent
1. Illiterate	209	69.4	265	87.7	474	78.6
2. Below Primary pass	8	2.6	5	1.7	13	2.2
3. Primary School pass	37	12.3	25	8.3	62	10.3
4. Middle School pass	12	4.0	2	0.7	14	2.3
5. High School pass	11	3.7	3	1.0	14	2.3
6. Intermediate and/or special training	5	1.7	1	0.3	6	1.0
7. Graduate	14	4.7	0	0.0	14	2.3
8. Postgraduate and/or professional training	5	[illegible]	0	0.0	5	0.8
9. Not known; not ascertained	0	0.0	1	0.3	1	0.2
Total	301	100.0	302	100.0	603	100.0

Close examination of Table 11-6 will establish that the trend shown with regard to the urban-rural differential in educational level of x fathers, is not only maintained, but is further accentuated in the distribution of educational level categories of mothers. As before, the distribution is bimodal for both urban and rural mother's samples. No less than 69.4% of the urban sample of mothers, and 87.7% of the rural sample of mothers are 'illiterate'. Only 12.3% of the urban mothers, and 8.3% of the rural mothers and 'primary school' pass. But whereas, among the urban mothers, about 11% are high school pass or above, 2% of the rural mothers have such educational qualification. The positive skew in the distribution is more pronounced in the case of the urban distribution.

The chi-square value for the above distribution is found to be 43.97% which, with 8 degrees of freedom, is isgnificant beyond .001 level, confirming a strong inter-dependence between rural-urban location of mothers and their educational attainments.

Inter-dependence between Rural-Urban Location and Education of Parents

We can here dispose off the question: 'What is the extent of inter-dependence between location of parents in rural or urban areas, and level x of education attained?' Since we have the chi-square values of the distributions, of educational level of fathers and mothers, respectively, among urban and rural samples, we can compile the corresponding co-efficients of contingency C, by using the formula:

$$C = \sqrt{\frac{X^2}{n + X^2}}$$

, where, n is the sample size

The coefficient of contingency C, for father's education and rural-urban residence, is found to be .302, and the same for mother's education and rural urban residence, is found to be only .260. This shows, that the extent of inter-dependence is only moderate, though it is definite.

If we make more wide-band cut-off points for categorizing educational level such as 'illiterate', 'below high school', 'under-graduate', and 'graduate and above', we get the following distribution for the father's sample.

Father's educational level

	Urban	Rural	Total
Illiterate	97	94	191
Below High school	84	154	238
Undergraduate	50	41	91
Graduate +	70	13	83
	301	302	603

This distribution gives a chi-square value of 40.75, which with 3 degrees of freedom, is again, very highly significant. But the co-efficient of contingency C, corresponding to the above chi-square value is again only .24. This confirms, that whichever way we look, by considering finer measures of level of educational attainment, or more broader categories, the degree of its association with rural-urban residence, though highly significant, is only moderate, so far as its magnitude is concerned. Whatever differential advantage accrues to the father's education in urban sample over the rural sample, is further eroded when we take educational attainment of mothers of the urban and rural samples.

Father's Occupation and Mother's Occupation

For describing the occupation of the parents no less than 9 different categories were used - the same system being applicable to both the parents. As far as there could be any consensus, these occupational categories were ordered in a hierarchical arrangement - beginning from the lowest category - 'unemployed' through 'unskilled manual workers and labourers' 'manual workers, skilled and semi-skilled' etc. to the highest category, 'Higher professional, Technical'. However, it has to be emphasized that the hierarchical ordering among the occupational categories

as used here is not as universally unambiguously monotonic, as 'educational level' categories used in the previous section are. But some sort of strong ordering is built into the category system used, and is an advantage for subsequent data analysis.

The frequency distribution of the occupational categories for the father's of the urban and rural samples of subjects has been shown in table 11-7.

TABLE 11 - 7

Frequency distribution of different categories of occupational levels of fathers of subjects in the entire sample

Occupational level category	Urban Frequency	Urban Per-cent	Rural Freq-uency	Rural Per-cent	Total Freq-uency	Total Per-cent
1. Unemployed	0	0.0	0	0.0	0	0.0
2. Unskilled manual workers and laborers	66	21.0	41	13.6	107	17.7
3. Manual workers, semi-skilled and skilled	80	26.6	96	31.8	176	29.2
4. Clerical and sale workers	44	14.6	93	30.8	137	22.7
5. Lower level proprietors and managers	45	15.0	56	18.5	101	16.7
6. Middle level proprietor and managers	24	8.0	9	3.0	33	5.5
7. Sub-professional technical; owners of business	25	8.3	7	2.3	32	5.3
8. Administrative, executive proprietors, higher level managers	11	3.7	0	0.0	11	1.8
9. Higher professional, higher technical	2	0.7	0	0.0	2	0.3
10. Not ascertained, dead	4	1.3	0	0.0	4	0.7
Total	301		302		603	

It is rather interesting to note that the distribution for the rural and urban samples are similar, with one difference – the distribution for the urban sample has a positive skew, which is much less prominent in the rural sample as compared to the rural sample.

The chi-square value for this distribution is found to be 59.90, which, with 8 df is significant beyond .01 level. The corresponding co-efficient of contingency, C is found to be .300, which confirms the existence of moderate degree of inter-dependence between rural-urban residence and occupational pattern of the father.

The frequency distribution of mother's occupation for the two samples are shown in Table 11 – 8.

Table 11 – 8

Frequency distribution of different categories of occupational levels of mothers of subjects in the entire sample

Occupational Level Category	Urban		Rural		Total	
	Frequency	Per-cent	Frequency	Per-cent	Frequency	Per-cent
1. Unemployed	265	88.0	272	90.1	537	89.1
2. Unskilled manual workers and laborers	20	6.6	25	8.3	45	7.5
3. Manual workers, semi-skilled and skilled	7	2.3	2	0.7	9	1.5
4. Clerical and sales workers	4	1.3	1	0.3	5	0.8
5. Lower level proprietors and managers	3	1.0	0	0.0	3	0.5
6. Middle level proprietors and managers	0	0.0	0	0.0	0	0.0
7. Sub-professional, technical owners of business	1	0.3	0	0.0	0	0.0
8. Administrators, executives, proprietors, higher level managers	0	0.0	0	0.0	0	0.0
9. Higher professional, higher technical	1	0.3	0	0.0	1	0.2
10. Not ascertained, dead	0	0.0	2	0.7	2	0.3
Total	301		302		603	

The distribution for occupational categories among the mothers of the subject samples, both urban and rural, do not contain any surprize: as such as 88.0% of the urban sample of mother's, and 90.1% of the rural sample of mothers, do not have any 'occupation' save that of house-keeping. Only 36 mothers of the urban sample, and 28 mothers of the rural sample have some sort of job, over and above, or besides, house keeping.

The value of the chi-square statistic for the above distribution is 12.21. which with 7 degrees of freedom, fails to reach significance at even .05 level, confirming the conclusion, that, in the matter of mothers having jobs, the difference between rural and urban mother is very slight.

Income

The monthly total income of the family - either a unit by itself, or of that part which is more or less unitary in nature even if embedded with in an extended family was carefully assessed by questioning the respondents themselves, and by checking and cross-checking with other knowledgeable person. The frequency distribution of income has been shown in Table 11-9

Table 11 - 9

Frequency distribution of monthly income of families of respondent samples

Monthly Income	Urban		Rural		Total	
	Frequency	Per-cent	Frequency	Per-cent	Frequency	Per-cent
1. Below Rs. 100	9	3.0	3	1.0	12	2.0
2. Rs. 100 - Rs. 200	56	18.6	33	10.9	89	14.8
3. Rs. 200 to Rs.300	71	23.6	71	23.5	142	23.5
4. Rs.300 to Rs.500	69	22.9	114	37.7	183	30.3
5. Rs.500 to Rs.700	43	14.3	57	18.9	100	16.6
6. Rs.700 to Rs.1000	25	8.3	18	6.0	43	7.1
7. Rs.1000 to Rs.1500	19	6.3	4	1.3	23	3.8
8. Rs.1500 and above	9	3.0	2	0.7	11	1.8
Total	301		302		603	

The distribution of income among the urban and rural samples runs true to form: the urban sample has greater variability, and has more families in the higher income brackets, as compared to the rural sample. But what is worth pointing out is the presence of a substantial 'middle income' group in the rural sample. This is the group, with income falling within the range of Rs.200 to Rs.700 per month. In the urban sample we have 183 (= 60.8%) families belonging to this group; in the rural sample, there are 242 (= 80.1%) families falling in this group. Again, in the urban sample, number of families having income above Rs.700 per month is 53 (=17.6%) but the same in the rural sample is only 24 (=8%). But this is counter-balanced by the fact that in the lower end, the number of families having income Rs.200 and below per month is 65 (= 21.6%) in the urban sample, and only 36 (= 11.9%) in the rural sample. In any case, it is quite clear that so far as income distribution is concerned the families of the rural sample are not too worse off, as compared to the families belonging to the urban sample. But the pattern of income distribution is quite different - the urban sample has both poorer and richer families than in the rural sample - in other words income disparity is more pronounced in the urban sample of families.

The chi-square value for the above distribution is found to be 37, 31, which with 7 degrees of freedom, is statistically significant well beyond .001 level. The coefficient of contingency, C, corresponding to this chi-square is only .24 which indicates a low degree of interdependence between rural - urban residence and distribution of income.

Religion

The religion to which the I S belonged was also carefully ascertained and recorded, as it is well known that, in the rural areas at least, this still makes a contribution in a subtle way in determine the over-all social status of a family or individual, the frequency distribution of different religious is shown in Table 11-10

Table 11 - 10

Frequency distribution of different religions among the sample of respondents

Religion	Urban		Rural		Total	
	Frequency	Per-cent	Frequency	Per-cent	Freqency	Per-cent
1. Hindu	254	84.4	289	95.7	543	90.0
2. Muslim	40	13.3	12	4.0	52	8.6
3. Christian	4	1.3	0	0.0	4	0.7
4. Sikh	0	0.0	1	0.3	1	0.2
5. Jain	3	1.0	0	0.0	3	0.5
6. Buddhist	-	-	-	-	-	-
7. Parsi	-	-	-	-	-	-
8. Others	-	-	-	-	-	-
9. Not known	-	-	-	-	-	-
Total	301		302		603	

There is again no surprise in Table 11-10 Not less than 84.4% among the urban sample, and not less than 95.7% among the rural sample are Hindus. There are only 13.8% Muslims among the urban sample, which goes down to only 4.0% among the rural sample. The number of Christians, Sikhs, and Jain is only 8 among a total sample of 603.

The chi-square value computed from this distribution is found to be 25.31, which with 4 degrees of freedom, is still highly significant, in fact beyond .001 level. But the corresponding coefficient of contingency is very low.

Caste

In our society, specifically in the rural areas, caste still plays an important role, in determining one's over all social status. This was carefully ascertained and recorded for all subjects. The distribution of the castes in the sample is shown in Table 11 - 11.

It will be noted that within the urban sample 53.5% belong to scheduled castes and backward castes Hindus, in the rural sample this increases to 58.9%. The per-centage

of upper caste Hindus among the rural sample (36.8%) is also higher than the corresponding per-centage of the upper caste Hindu in the urban sample. The chi-square value for this distribution is 22.05, which with 5 degrees of freedom is significant beyond .001 level. However, the value of C is quite low.

Table 11 - 11

Frequency distribution of different castes among the sample members

Caste	Urban Freq-uency	Urban Per-cent	Rural Freq-uency	Rural Per-cent	Total Freq-uency	Total Per-cent
1. Scheduled Caste	22	7.3	26	8.6	48	8.0
2. Scheduled Tribe	0	0.0	0	0.0	0	0.0
3. Backward caste	139	46.2	152	50.3	291	48.3
4. Upper Caste	96	31.9	111	36.8	207	34.3
5. Muslim	40	13.3	12	4.0	52	8.6
6. Christian	4	1.3	0	0.0	4	0.7
7. Sikh	0	0.0	1	0.3	1	0.2
8. Not known	0	0.0	0	0.0	0	0.0
Total	301		302		603	

Muslims, Christians and Sikhs have been shown as castes in Table 11 - 11. The reasons for this will be given when we next take up the questions of developing a composite scale for assessing social-economic status from the 7 different variables discussed above.

Inter-relationship between different components of Family Background and Schools Variables

Among the seven components included within the family background variable, four are characteristically nominal or categorical. These are

(1) Father's occupation

(2) Mother's occupation

(3) Religion

(4) Caste

Likewise, among the school variables, three components are typically nominal or categorical:

(1) School Management

(2) Sex composition of students in the school

(3) Shift system

A few questions naturally arise:

(1) What is the nature of inter-relationship between the four components of the family background variable ?

(2) What is the nature of inter-relationship between the 3 components of the school variable ?

(3) Is there any systematic relationship between the four family background components on one hand, and the three school variable components on the other ?

The appropriate measure of association between these categorical components is the mean-square co-efficient of contingency 'C', which has two interesting properties:

(1) It can be interpreted as a measure being resemblance to the coefficient of correlation,

(2) Secondly, it is inversely related to the chi-square distribution, therefore, its significance can be estimated quite confidently.

A high value of the co-efficient of contingency C, may be interpreted to mean that there is some prominent trend towards a clustering - of certain pairs of components occurring more frequently together than more chance distribution would warrant or what can be expected on a strictly equi-proportional partition of the components among the given alternatives for each component. The statistical significance of C in turn, indicates, whether the departure of the obtained frequencies in the contingent distributions could not have arisen due to chance only.

So far as the present sample is concerned, coefficients of contingency can be computed, for using small core groups - such as for subjects of the same sex, age-grade, and belonging to schools of the same location, say

rural or urban. Admittedly, there would be sampling fluctuations in the value of C, which could be progressively eluminated by increasing sample size, by combining 2 or more sampling categories together, like -grade, sex., location etc.

As heterogeneity is increased in the sample, by combining two or more catogorics together, what systematic effect it has upon the values of the contingency co-efficient will also become more apparent. The rosults of the computations of the mean-square co-efficients of contingency, presented below.

The valuos of C for male students in the urban schools, for the three grades are shown in Table 11-12 Similarly, the values of C, for the female students, are x shwon in Table 11-13.

For a systematic interpretation of the matrices giving the co-efficients of contingency values, we may remember the following points:

The triangular matrix is made up of 3 parts a triangular matrix, along the diagonal at the upper left hand corner - giving the values of C among components of the 4 families, background variables; another triangular matrix along the diagonal at the lower right hand corner, giving the value of C among components of the schools variables, and an off-diagonal rectangular sub-matrix giving the values of C between two types of components one belonging to the family background variables, and the other belonging to school variables. The two triangular sub-matrices, along the principal diagonal, can be called within-group matrices, and the rectangular sub-matrix off the principal diagonal, can be called the between-group matrix.

On logical ground we should expect the C values of the off-diagonal, between groups sub-matrix to be in general lower in magnitude than those of the diagonal within-group sub-matrices.

Table 11 -12

Mean - square contingency correlation among selected background and school variables for male subjects of from urban schools, for three grades

Variables	Background variables				School variables		
	Father occup.	Mother occup.	Reli-gion	Caste	Mana-gement	Sex compost.	Shift system
1	2	3	4	5	6	7	8
ade I Male urban N = 66							
Father's Occup.	.	519	438	584	638	220	337
Mother's Occup.	.	.	734	800	357	185	163
Religion	.	.	.	815	318	116	163
Caste	.	.	.	.	385	240	243
School Management						544	706
Sex Composition	.						518
Shift System	.						
ade II Male Urban N = 57							
Father's occup	.	602	522	637	686	350	424
Mother's Occup.	.	.	433	445	339	127	137
Religion	.	.	.	814	385	177	172
Caste	.	.	.	.	478	313	244
School Management						541	707
Sex Composition							527
Shift System							.
ade V Male Urban N = 65							
Father's Occup	.	334	754	766	654	337	294
Mother's occup			088	379	210	092	061
Religion				816	358	253	171
Caste				.	484	308	217
School Management						568	706
Sex Composition							552
Shift System							.

N.B. Decimal points have been omitted.

Table 11 - 13

Mean-square contingency correlation among selected background and school variable for females subjects of the three grades from urban schools

Variables	Background variable				School variables		
	Father's Occup	Mother's Occup	Religion	Caste	Management	Sex composn.	Shift system
1	2	3	4	5	6	7	8
Grade I Female Urban N = 42							
1. Father's Occup		670	444	625	671	480	467
2. Mother's occup.			584	673	426	236	209
3. Religion				814	361	297	188
4. Caste					374	380	275
5. School Management						499	393
6. Sex Composition							595
7. Shift System							
Grade II Female Urban N = 39							
1. Father's Occup		398	347	558	594	404	345
2. Mother's Occup			078	210	244	222	134
3. Religion				706	232	044	185
4. Caste					287	161	192
5. School Management						528	383
6. Sex Composition							555
7. Shift system							
Grade V Female Urban N = 32							
1. Father's Occup		761	377	476	643	571	502
2. Mother's occup			141	374	476	418	336
3. Regligion				706	060	002	231
4. Caste					130	115	257
5. School Management						639	478
6. Sex Composition							574
7. Shift System							

N. B. Decimal points have been omitted.

Study of the two tables, 11 - 12 and 11 - 13 points to the following facts:

(a) The magnitude of the co-efficients, C among the components of family background are generally of moderately high value in the all of six groups. The highest values of C are found between Caste and religion the lowest being .706, and the highest being .816. Again C value between mother's occupation and religion generally tend to be low. The C values between the remaining components fall between these extremes. Lastly the values of C have tended to be lower for the female groups then those for the male groups.

(b) The magnitude of the values of C between components of the three school variables are also moderately high, but tends to be somewhat lower, at the higher end, than that for the C values between componenets of the family background variables. Here, the minimum is 383 and the maximum is 707, whereas the median value of the 36 C's for the family background variables is between .558 and .584, the median value of the 18 C's for the school variables is between .544 and .552. There is much less spread among the C values for the school variables then for the family background variables.

(c) The C values for the three groups of components one belonging to family background variables and the other to the school variables, are generally of low magnitude in all the six groups. Among the 96 C values for the groups under consideration, the lowest is .002 and the highest is .686. The one coefficient which is uniformly high in all the six groups, is that between 'father's occupation' and 'school management' - the lowest C value being .594 and the highest being .686.

So far we have been considering only the urban schools. We may now turn to a consideration of the same types of distribution of C values for students of the rural

schools. These are shown in Table 11-14 and 11-15 for male students and female students of rural schools respectively.

Table 11 - 14

Mean-square contingency correlations among selected Background and School variables for male subjects of the three grades from rural schools

Variables	Background variables: Father's Occup.	Mother's Occup.	Reli-gion	Caste	School variables. Mana-gement	Com pos -ition	Shift System
1	2	2	4	5	6	7	8
Grade I Male Rural N = 61							
1. Father's occup	.	509	230	579	175	004	004
2. Mother's occup		.	076	531	053	004	004
3. Religion			.	705	060	003	003
4. Caste				.	240	003	003
5. Management						002	002
6. Composition							001
7. Shift system							.
Grade II Male Rural N = 66							
1. Father's Occup		504	243	601	273	005	005
2. Mother's Occup			058	568	183	001	001
3. Religion				701	045	004	004
4. Caste				.	339	004	004
5. Management						002	002
6. Composition							001
7. Shift System							.
Grade V Male Rural N = 83							
1. Father's Occup		410	315	457	303	006	006
2. Mother's Occup			043	222	156	005	005
3. Religion				705	063	003	003
4. Caste				.	164	003	003
5. Management						002	002
6. Composition							001
7. Shift system							.

NB. Decimal points have been omitted.

Table 11 - 15

Mean-square contingency correlation among selected background and school variables for female subjects of the three grades of rural schools

Variables	Background variable				School variables		
	Father's Occup.	Mother's occup	Religion	Caste	Management	Composition	Shift system
1	2	3	4	5	6	7	8
Grade I, Female Rural N = 35							
1. Father's Occup.	.	520	288	479	003	275	003
2. Mother's Occup			075	535	002	316	002
3. Religion				706	002	220	002
4. Caste				.	004	275	004
5. Management						001	001
6. Composition							001
7. Shift system							.
Grade II Female Rural N = 26							
1. Father's Occup.		211	256	404	379	354	003
2. Mother's Occup.		.	567	567	040	210	003
3. Religion				706	057	022	002
4. Caste				.	227	313	002
5. Management						210	003
6. Composition							001
7. Shift System							.
Grade V Female Rural N = 31							
1. Father's Occup.		569	255	537	451	449	004
2. Mother's Occup			059	568	568	196	003
3. Religion				815	085	284	003
4. Caste				.	436	312	004
5. Management						277	002
6. Composition							001
7. Shift System							.

NB Decimal points omitted.

Close study of the distribution of C values in the above two tables will point to a few interesting things:

(1) The magnitude of the C values is much less, compared to those for the urban schools, in all the sub-matrices.

(2) The difference between the magnitudes of the C values, for the male students and for the female students is only slight, for almost all sub-matrices.

(3) A most striking finding is, that the magnitude of the C values for the associations within the family background variables are moderately high, in all the six sub-matrices, in which the only exception are the C values between 'mother's occupation' and 'religion' which are very low in 5 out of 6 sub-matrices.

(4) Lastly, the C values for the school variable 'shift system' with all the remaining 6 variables is uniformly near zero, which is understandable as there is hardly any double shift system schools in the rural areas. The variables of sex composition behaves rather peculiarly for male students: the C values between this variable and the remaining six variable are near zero, but for girls, the C values are generally somewhat larger, most of them ranging between .200 to .300. The last school variable 'school management' has C values which vary unsystematically from group to group, half of them tending to be zero, and nearly half ranging between .100 to .300.

In the next stage, let us see how the magnitude of the C values varies, as greater heterogeneity is introduced in the samples by combining the groups for both the sexes together. The distribution of the C values for the three grades of students of both the sexes, but belonging to schools in the urban areas and rural areas, are shown in Table 11-16 and 11-17 respectively.

Perusal of the distribution of the C values in the two tables, one for urban schools and the other for rural schools will show, that some degree of stablization appears to have been brought about in their magnitudes. The number of coefficients having very high or low values has decreased somewhat. Moreover, the magnitude of C's for the urban school is in general higher than that of the C's for the

Table 11 - 16

Mean square contingency, correlation among selected background and school variables for subject of the three grades pooled for both the sexes from the urban schools

Variables	Background variable				School variables		
	Father's Occup	Mother's Occup.	Religion	Caste	Management	Composition	Shift system
1	2	3	4	5	6	7	8
Grade I M.F.Urban N = 108							
1. Father's Occup	•	566	421	566	639	378	274
2. Mother's Occup			648	741	351	210	071
3. Religion				815	321	178	159
4. Caste					341	302	236
5. Management						602	463
6. Composition							605
7. Shift System							•
Grade II M.F. Urban N = 96							
1. Father's Occup	•	396	410	563	643	389	282
2. Mother's Occup			306	340	298	131	142
3. Religion				813	212	123	053
4. Caste					364	304	152
5. Management						593	543
6. Composition							547
7. Shift System							•
Grade V, M.F. Urban N = 97							
1. Father's Occup.		631	642	672	624	364	290
2. Mother's Occup.			116	319	303	217	189
3. Religion				814	308	232	206
4. Caste					305	306	257
5. Management						626	479
6. Composition							602
7. Shift System							

NB Decimal points omitted.

Table II - 17

Mean-square contingency correlation among selected Background and School variables for subjects of the three grades pooled for both the sexes from the rural schools.

Variables	Background variables				School variables		
	Father's Occup	Mother's Occup.	Religion	Caste	Management	Composition	Shift system
1	2	3	4	5	6	7	8
Grade I M.F. Rural N =							
1. Father's Occup	.	490	140	530	133	144	005
2. Mother's Occup			07[illegible]	[illegible]	049	110	005
3. Religion				705	054	092	002
4. Caste					240	261	003
5. Management						114	002
6. Composition							001
7. Shift System							
Grade II, M. F. Rural N = 92							
1. Father's Occup		537	132	[illegible]	232	348	004
2. Mother's Occup			[illegible]	[illegible]	196	169	005
3. Religion				[illegible]	060	092	003
4. Caste					319	161	003
5. Management						138	002
6. Composition							001
7. Shift System							
Grade V, M. F. Rural N = 114							
1. Father's Occup		332	281	434	323	293	005
2. Mother's Occup			050	305	267	089	006
3. Religion				812	072	259	006
4. Caste					142	260	006
5. Management						128	002
6. Composition							001
7. Shift System							

NB. Decimal points omitted.

C's for the rural schools. This is a general trend, but there are a few exceptions also.

Compared to the extent of stablization brought about into the magnitude of C values, by ignoring sex, and there by increasing the size of the groups, what is the situation when, we keep the two sex groups separate, but combine the classes across locations, that is, combine urban and rural schools together ? The relevant distributions of the C values are shown in Table 11-18 and 11-19. Even a cursory study of the two tables will at once show that, on the whole, there has been greater improvement in the magnitudes of the C values, in all the six distribution now under consideration, by combining urban and rural schools together.

To have a more precise idea about the relative magnitudes of improvement in the size of the values of C, by combining the two types of schools, we may look into the frequency distribution of the C's in terms of other respective sizes. This is shown in Table 11-20.

A perusal of the distribution of the magnitude of C values shown in Table 11-20 will be rewarding. First it is quite clear, that the on-diagonal sub-matrices contain more C's with higher values than off diagonal sub-matrices - which fully supports what was expected on logical grounds. Secondly, for "within-school variables", sub-matrices, the number of C's with high values is larger for urban schools compared to rural schools, which is again what is expected on logical ground, and is higher for male students than for female students.

Further, for the off-diagonal sub-matrices, that is for distributions of sizes of C's between background vs school variables, again there are many more high vlaued C's among the urban schools than among rural schools, and among male students than among female students. In fact, lack of variability among the school variables, tends to

Table 11 - 18

Mean square contingency correlations among selected background variables and school variables of Grade I Grade II and Grade V male subjects of both urban and rural school together

Variables	Background Variables				School Variables		
	Father's Occup.	Mother's Occup.	Religion	Caste	Management	Composition	Shift system
1	2	3	4	5	6	7	8.
Grade I, Male Urban Rural N = 127							
1. Father's Occup.	.	494	404	538	563	180	319
2. Mother's Occup.		.	627	725	202	116	111
3. Religion			.	812	264	123	087
4. Caste				.	282	218	138
5. School Management					.	542	706
6. Sex Composition						.	537
7. Shift System							.
Grade II, Male, Urban Rural N = 123							
1. Father's Occup	.	628	487	631	527	277	348
2. Mother's Occup			407	538	244	100	108
3. Religion				812	270	042	078
4. Caste				.	317	158	132
5. School Management						552	706
6. Sex Composition							549
7. Shift System							.
Grade V Male Urban Rural N = 148							
1. Father's Occup.		327	741	740	519	212	211
2. Mother's Occup		.	071	274	177	066	046
3. Religion				812	293	111	077
4. Caste					268	156	108
5. School Management						568	705
6. Sex Composition							567
7. Shift System							.

NB. Decimal points omitted.

Table 11 - 19

Mean-square contingency correlation among selected background and school variables for Grade I, Grade II and Grade V female subjects, of both urban and rural schools together

Variables	Background variables				School variables		
	Father's Occup.	Mother's Occup.	Religion	Caste	Management	Composition	Shift system.
1	2	3	4	5	6	7	8
Grade I, Female Rural Urab N = 77							
1. Father's Occup.	.	642	378	542	669	305	294
2. Mother's Occup.		.	582	670	429	233	185
3. Religion				814	370	222	071
4. Caste				.	371	225	167
5. School Management					.	317	180
6. Sex Composition						.	480
7. Shift System							.
Grade II Female Urban Rural N = 65							
1. Father's Occup.	.	416	294	439	437	314	273
2. Mother's Occup.		.	362	389	243	205	092
3. Religion			.	706	164	015	156
4. Caste				.	187	045	163
5. School Management					.	447	218
6. Sex Composition							408
7. Shift System							.
Grade V, Female Urban Rural N = 63							
1. Father's Occup.	.	761	300	453	533	377	305
2. Mother's Occup.			103	422	443	237	210
3. Religion				814	060	155	118
4. Caste				.	208	202	179
5. School Management						461	234
6. Sex Composition							420
7. Shift System							.

NB. Decimal points omitted.

Table 11 - 20

Frequency distribution of magnitude of C values among selected background and school variables for groups formed by combining the sexes, and schools of both locations, together.

Value of C	On-Diagonal sub-matrices Among Background variables: Sexes Together		Locations Together		On-Diagonal sub-matrices among school variables: Sexes Together		Location Together		Off-diagonal sub-matrices between Background Vs school variables: Sexes Together		Location Together	
	U	R	M	F	U	R	M	F	U	R	M	F
.900-998	-	-	-	-	-	-	-	-	-	-	-	-
.80 - .899	3	1	3	2	-	-	-	-	-	-	-	-
.70-.79	1	2	3	2	-	-	-	-	-	-	-	-
.60-.69	4	4	3	2	4	[illegible]	3	-	3	-	-	-
.50-.59	3	3	2	2	3	-	-	-	-	-	3	-
.40-.49	2	2	4	4	2	-	6	5	-	-	-	-
.30-.39	4	1	1	4	-	-	-	1	13	3	3	3
.20-.29	-	1	1	1	-	1	-	2	11	7	11	5
.10-.19	1	2	-	1	-	2	-	1	7	7	13	9
.00-.9	-	2	1	-	-	6	-	-	2	19	6	19
Sum	18	18	18	18	9	9	9	9	36	36	36	36

reduce the number of high valued C's.

To summarize: when large groups are made by combining either the two sexes, or schools of urban and rural locations together, the number of coefficient of contingency, C among the family background variables, which are higher than, say, .500 is quite substantial; this somewhat less so, for the C's among the school variables. When associations between background variables and school variables are considered for the urban schools, and for the male students only, there are a few C's with magnitudes exceedin .500 . For rural schools, and for female students, the C's are very low, more than half clustering around zero.

Looking at the distribution of the C values, more closely, we may conclude, that so far as the school variables are concerned, due to lack of variability in this variable in the rural schools, the coefficients of contingency, have always tended to have low values. By combining groups across the two types of locations for the schools, the number of C's with higher vlaues, increases only for the male students, but fails to do so for the female students. So far as the coefficient of contingency across two classes of variables - viz background variables and school variables - are concerned, again, for rural schools the number of C's with high magnitudes is low, and by combining across the two locations, still it is low for the female subjects.

Let us now push this of analysis further.

So far, the same age grade comprized an intact group for computing the coefficients of contingency among the categorical components of the family background variables and school variables. Now the three age groups can be combined togeth. r, and than the contingency coefficients may be computed. For male subjects separately, and female subjects separately, and also for urban schools, and rural schools separately. This has been done, and the contingency coefficients as obtained have been shown in Table 11 - 21 and 11 - 22

Study of the contingency coefficients shown in Tables 11 - 21 and 11 - 22 with at once make it apparent that considerable stabilization has been effected by combining the groups across age-grades, before computing the contingency coefficients.

Table 11 - 21

Mean-square contingency correlations among selected background and schoolsvariables for all male subjects of three grades of urban schools, of rural schools, separately and of urban and rural schools together

Variables	Background variables				School Variables		
	Father's Occup.	Mother's Occup.	Reli- gion	Caste	Manage- ment	Compo- sition	Shift sys- tem
1	2	3	4	5	6	7	8
Grade I, II, V Male, Urban N = 188							
1. Father's Occup.		467	595	629	638	208	287
2. Mother's Occup.			468	568	299	127	123
3. Religion				815	335	153	169
4. Caste					415	260	223
5. School Management						551	706
6. Sex Composition							532
7. Shift System							
Grade I, II, V Male, Rural N = 120							
1. Father's Occup.		430	124	474	179	006	006
2. Mother's Occup.			063	472	131	010	010
3. Religion				704	058	003	003
4. Caste					240	003	003
5. School Management						002	002
6. Sex Composition							001
7. Shift System							
Grade I, II, V Male U+R N = 398							
1. Father's Occup.		474	567	606	507	135	238
2. Mother's Occup.			394	543	179	085	087
3. Religion				812	269	046	081
4. Caste					269	139	123
5. School Management						554	706
6. Sex Composition							551
7. Shift System							

NB. Decimal points omitted

Table 11.22

Mean-square contingency correlation among selected background and school variable for all female subjects, ofurban schools or rural schools and urban and rural schools together.

Variables	Background Variables				School Variables		
	Father's Occup.	Mother's Occup.	Religion	Caste	Management	Composition	Shift system.
1	2	3	4	5	6	7	8
Grade I, II, V Female Urban N = 113							
1. Father's Occup.		766	344	521	612	435	409
2. Mother's Occup.			578	639	367	261	210
3. Religion				813	178	128	093
4. Caste					251	173	128
5. School Management						555	429
6. Sex Composition							579
7. Shift System							.
Grade I, II, V Female, Rural N = 92							
1. Father's Occup.		509	249	456	338	152	005
2. Mother's Occup.			365	569	252	143	005
3. Religion				813	053	100	005
4. Caste					325	179	006
5. School Management						183	003
6. Sex Composition							001
7. Shift System							.
Grade I,II, V Female U + R N = 205							
1. Father's Occup.		757	291	447	518	275	255
2. Mother's Occup.			581	649	341	191	160
3. Religion				859	169	099	056
4. Caste					184	120	117
5. School Management						413	220
6. Sex Composition							445
7. Shift System							.

NB. Decimal points omitted.

Table 11 - 23

Frequency distribution of magnitudes of C values among selected background and school variables for groups formed by combining age grades together, for males and females separately, and urban and rural schools, separately

Value of C	On-diagonal sub-matrices among background variables						On-diagonal sub-matrices among School Variables						Off-diagonal sub-matrices Between Background and School Variables					
	Urban		Rural		U + R		Urban		Rural		U + R		Urban		Rural		U+R	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
.90 - 99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
.80 - 89	1	1	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
.70 - .79	-	1	1	-	-	1	1	-	-	-	1	-	-	-	-	-	-	-
.60 - .69	1	1	-	-	1	1	-	-	-	-	-	-	1	1	-	-	-	-
.50 - .59	2	2	-	2	2	1	2	2	-	-	2	-	-	-	-	-	1	1
.40 - .49	2	-	3	1	1	1	-	1	-	-	-	2	1	2	-	-	-	-
.30 - .39	-	1	-	1	1	-	-	-	-	-	-	-	1	1	-	2	-	1
.20 - .29	-	-	-	2	-	2	-	-	-	-	-	1	5	3	1	1	3	2
.10 - .19	1	-	1	-	-	-	-	-	-	1	-	-	4	4	2	-	4	6
.00 - .09	1	-	1	-	-	-	-	-	3	2	-	-	-	1	9	9	4	2
Total	3	6	6	7	6	7	3	3	3	3	3	3	12	12	12	12	12	12

The Trend exhibited in the distribution of C values in Table 11 - 20 is also repeated in the distribution of C valu shown in Table 11 - 23

This is brought out well by the frequency distributions of the magnitude of the contingency coefficients obtained from different groups, shown in Table 11 - 23.

In general, the female groups have lesser number of C's with high values, compared to male groups. Further, when the group is made larger, by combining urban and rural schools together, some improvement in the C values tends to take place. This is because of greater heterogeneity introduced due to increase in group size across location of schools.

In the last section of this analysis, are presented the values coefficients of contingency, when still larger and more heterogenous groups are composed. These are shown in Tables 11 - 24 and 11 - 25. In 11 - 24 are presented the C values for the same sets of variables, for the three age-grade groups separately, but both the sexes, and both the types of schools are put together. In Table 11 - 25 however, while the age-grades are taken together, the school groups by location are first kept intact and then combined.

The phenomenon of stabilization in the contingency coefficients, resulting from increasing group size with increasing group heterogeneity, is shown quite convincingly in Table 11 - 24 and 11 - 25. This is brought out more strikingly in Table 11 - 26 where the frequency distributions of the sizes of the C values for different groupings are shown It will be noted that when grades are combined, the values of C's are uniformly high for both "within" background and "within" school variables, but ~~is~~ not so, for "between" background and school variables. But, the effect of grouping on the basis of location of schools, in which rural school C values tend to be low, is not much counteracted by combining with urban schools. The effect of age-grade grouping is only slight, and is shown more prominently in age-grade V, and not in age grades I and II.

Table 11 - 24

Mean-square contingency correlations among selected background and schools variables for all subjects of Grade I, of Grade II and of Grade V shown separately.

Variables	Background Variables				School Variables		
	Father's Occup.	Mother's Occup.	Religion	Caste	School Management	Sex Composition	Shift System
Grade I, M+F U +R N = 204							
1. Father's Occup.		559	392	519	588	244	163
2. Mother's Occup.			595	699	256	155	104
3. Religion				813	286	133	060
4. Caste					278	241	140
5. School Management						569	448
6. Sex Composition							532
7. Shift System							
Grade II, M+F, U+R N = 188							
1. Father's Occup.		470	347	555	484	325	230
2. Mother's Occup.			356	514	236	134	114
3. Religion				810	169	054	044
4. Caste					224	196	107
5. School Management						576	545
6. Sex Composition							494
7. Shift System							
Grade V, M+F, U+R N = 211							
1. Father's Occup		621	635	646	507	264	171
2. Mother's Occup			081	296	259	100	106
3. Religion				859	260	176	083
4. Caste					201	212	133
5. School Management						591	459
6. Sex Composition							526
7. Shift System							

NB: Decimal points omitted.

Table 11-25

Mean square contingency correlation among selected background variable and school variables for all subjects of the rural schools, and of the entire sample.

Variables	Background Variables				School Variables		
	Father's Occup.	Mother's Occup.	Religion	Caste	School Management.	Sex Composition	Shift system
Grade I,II,V M+F Urban N = 301							
1. Father's Occup.		651	468	554	624	308	228
2. Mother's Occup.			468	558	316	155	073
3. Religion				814	286	157	140
4. Caste					348	273	211
5. School Management						607	487
6. Sex Composition							588
7. Shift System							
Grade I, II,V M+F Rural N = 302							
1. Father's Occup		441	153	478	208	175	005
2. Mother's Occup			192	496	158	058	010
3. Relgiion				806	063	135	008
4. Caste					222	157	009
5. School Management						128	002
6. Sex Composition							001
7. Shift System							
Grade I,II,V M+F U+R N=603							
1. Father's Occup		645	441	531	504	171	124
2. Mother's Occup			435	561	234	092	057
3. Relgiion				854	242	098	050
4. Caste					230	184	119
5. School Management						578	479
6. Sex Composition							517
7. Shift System							

NB: Decimal points omitted.

Tablo 11 - 26

Frequency distribution of magnitudes of C values among selected background and school variables for groups formed by combining both sexes and locations together for each of the three age-grades, and then by combining the three age grades, and two sexes, but keeping the two locations separate, compared to the entire same of all children, combing three age grades, two sexes and schools of two locations.

Value of C	On-diagonal sub-matrices Among background variables: Sexes and locations together I	II	V	Age-graes together U	R	U+R	On-diagonal sub-matrices. Among school variables: Sexes and locations together I	II	V	Sexes and grades together. U	R	U+R	Off-diagonal sub-matrices Between background and school variables: Sexes and locations together I	II	V	Sexes & grades together U	R	U+R
.99-99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
.80-90	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
.70-.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
.60..69	1	-	3	1	-	1	-	-	-	1	-	-	-	-	-	1	-	-
.50.59	3	2	-	2	-	2	2	2	2	1	-	2	1	-	1	-	-	1
.40.49	-	1	-	2	3	2	1	1	1	1	-	1	-	1	-	-	-	-
.30-.39	1	2	-	-	-	-	-	-	-	-	-	-	-	1	-	3	-	-
.20-.29	-	-	1	-	-	-	-	-	-	-	-	-	5	3	5	4	2	3
.10-.19	-	-	-	-	2	-	-	-	-	-	1	-	5	5	5	3	4	4
.00-.10	-	-	1	-	-	-	-	-	-	-	2	-	1	2	1	1	6	4
Total	6	6	6	6	6	6	3	3	3	3	3	3	12	12	12	12	12	12

Table 11 - 27 (i)

Frequency distribution of magnitude of C values for pairs of components of selected background and school variables obtained from groups composed differently from simplest core groups homogenous with respect to age-grades, sex and locations of school, to increasing size and heterogeneity

PAIR OF VARIABLES	VALUES OF C .00-.09	.10-.19	.20-.29	.30-.39	.40-.49	.50-.59	.60-.69	.70-.79	.80-.89
1. Father's Occup Vs Mother Educn	-	-	1	5	9	9	8	4	-
2. Father's Occup. Vs Religion	-	4	9	8	8	3	2	2	-
3. Father's Occup. Vs Caste	-	-	-	-	11	15	8	2	-
4. Father's Occup Vs Management	1	3	3	4	3	10	23	-	-
5. Father's Occup. Vs Sex Composition	4	6	9	12	4	1	-	-	-
6. Father's Occup. Vs. Shift System	12	3	12	5	3	1	-	-	-
Total	17	16	34	34	33	39	41	3	-
1. Mather's Occup. Vs. Father's Occup.	-	-	1	5	9	9	8	4	-
2. Mother's Occup. Vs. Relgn.	12	4	0	5	6	6	2	1	-
3. Mother's Occup. Vs. Caste.			4	6	4	13	5	2	1
4. Mother's Occup. Vs. Management-	4	7	13	7	4	1	-	-	-
5. Mother's Occup. Vs. Sex Composition	10	15	9	1	1	1	-	-	-

Table 11 - 27 (ii)

PAIR OF VARIABLES	VALUES OF C .00-.09	.10-.19	.20-.29	.30-.39	.40-.49	.50-.59	.60-.69	.70-.79	.80-.89
6. Mother's Occup. Vs Shift System	19	13	3	1	-	-	-	-	-
Total	45	39	30	25	24	30	16	7	1
1. Religion Vs. F. Occup	-	4	3	-	5	3	2	2	-
2. " " M Occup	-	4	0	5	6	4	2	1	-
3. " " Caste	12		1	-	3	7	2	5	13
4. " " Management	13	4	11	7	1	-	-	-	-
5. " " Sex Comp.	15	14	7	-	-	-	-	-	-
6. " " Shift System	24	10	2	-	-	-	-	-	-
Total	52	38	30	22	15	16	6	11	13
1. Caste Vs. F. Occup	-	-	-	-	-	11	15	6	2
2. " M Occup	-	-	4	6	4	13	6	2	1
3. " Religion	-	-	1	2	[illegible]	7	5	8	13
4. " Management	1	5	15	11	4	-	-	-	-
5. " Sex Comp.	6	11	11	8	-	-	-	-	-
6. " Shift System	12	15	9	-	-	-	-	-	-
Total	19	31	40	27	11	31	24	18	16

Table 11 - 27 (iii)

Frequency distribution of magnitude of C values for pairs of components of selected background and school variables obtained from groups composed differently, from simplest core groups homogenous with respect to age grades, sex and locations of school, to increasing size and heterogeneity

PAIR OF VARIABLES	Values of C								
	.00-.09	.10-.19	.20-.29	.30-.39	.40-.49	.50-.59	.60-.69	.70-.79	.80-.89
1. School Management Vs F. Occup.	1	3	3	4	5	10	12	-	
2. " " Vs M. Occup.	4	7	13	7	4	1	-	-	
3. " " Vs Religion	13	4	11	7	1	-	-	-	
4. " " Vs Caste	1	5	15	11	4	-	-	-	
5. " " Vs Sex Composition	5	5	2	1	4	15	4	-	
6. " " Vs Shift System	12	1	4	2	7	2	-	5	
Total	36	25	48	32	25	28	16	8	
1. Sex Comp. Vs. F. Occup.	4	6	9	12	4	1	-	-	
2. " " Vs. M. Occup.	10	15	9	1	1	-	-	-	
3. " " Vs. Religion.	13	14	7	-	-	-	-	-	
4. " " Vs. Caste	1	5	15	11	4	-	-	-	
5. " " Vs. School management	5	5	2	1	4	15	4	-	
6. " " Vs. Shift System	12	-	-	-	5	17	2	-	
Total	47	45	42	25	18	33	6	-	

Table II - 27 (iv)

Frequency distribution of magnitude of C values for pairs of components of selected background and school variables obtained from groups composed differently, from simplest core groups homogenous with respect to age grades, sex and locations of school, to increasing size and heterogeneity

PAIR OF VARIABLES	VALUES OF C								
	.00-.09	.10-.19	.20-.29	.30-.39	.40-.49	.50-.59	.60-.69	.70-.79	.80-.89
1. Shift System Vs. F. Occup.	12	3	12	5	3	1	-	-	-
2. " " Vs. M. Occup.	19	13	3	1	-	-	-	-	-
3. " " Vs. Religion	24	10	2	-	-	-	-	-	-
4. " " Vs. Caste	12	15	9	-	-	-	-	-	-
5. " " Vs. School Management	12	1	4	2	7	2	8	-	-
6. " " Vs. Sex Composition	12	-	-	-	5	17	2	-	-
Total	91	42	30	8	15	20	10	-	-
Grand Total	519	234	175	138	184	95	57	15	-

Before we end this section, it will be worth while to look a little more closely into the pairs of variables for which the coefficients of contingency are uniformly high, for which it is moderate, and for which it is low. The frequency distribution of the magnitudes of C values, for each pair of variables, both on diagonal and off-diagonal sub-matrices shown in all the previous tables (from Table 11-12 to 11-26) are shown in Table 11 - 27.

Close study of the figures given in Table 11 - 27 will show how different pairs variables have been associated with each other, when group size and composition have been systematically varied.

There are two possible approaches for ranking the seven components of the classes of variably in terms of the extent of association of each component with the remaining six. First, we can consider each of the pairs themselves. Now 7 components give rise to 21 pairs. By taking the median values of the distributiom of the magnitude of C values for each of the 21 pairs, the following order emerges:

The first striking point to be noted in the ranking is that among the first 10 ranked pairs, only one is an off-diagonal pair, viz. Father's Occupation vs School Management - the remaining are on-diagonal pairs. Secondly, the values of the contingency co-efficients tend to be higher for 'between family background variables' as compared to 'between school variables'.

Next, we can try to rank each of the 7 components in terms of the distribution of the magnitudes of each of the component with the remaining 6 components. One set of ranks is obtained by taking the median value of the coefficient of contingency, for the set of six distributions of these coefficients for each of 7 components. The other set of rank is obtained by averaging the rank of each of the components in the 21 pairs shown above.

Pair of Components	on diagonal/Off diagonal		Median val of C
1. Caste Vs Religion	On diagonal		.733
2. Caste Vs. Father's Occupation	On diagonal		.620
3. Father's occupation Vs. School Management		Off diagonal	.545
4. Caste Vs Mother's Occup	On diagonal		.528
5. Caste Vs Mother's Occup.	On diagonal		.526
6. School Management Vs Sex Composition	On diagonal		.502
7. Shift system Vs Sex Composition	On diagonal		.501
8. Religion Vs Father's Occupation	On diagonal		.348
9. School Management Vs Shift System	On diagonal		.345
10. Religion Vs Mother's Occupation	On diagonal		.335
11. Father's Occupation Vs Sex Composition		Off diagonal	.284
12. Caste Vs School Management		Off diagonal	.275
13. Mother's Occupation Vs School Management		Off diagonal	.249
14. Father's Occupation Vs Shift System		Off diagonal	.220
15. Caste Vs. Sex Composition		Off diagonal	.204
16. Religion Vs School Management		Off diagonal	.204
17. Caste Vs Shift System		Off diagonal	.155
18. Mother's Occupation Vs Sex Composition		Off diagonal	.148
19. Religion Vs Sex Composition		Off diagonal	.116
20. Mother's Occupation Vs Shift System		Off diagonal	.089
21. Religion Vs Shift System		Off diagonal	.070

Each component occurs in six pairs, the ranks for which may be pooled and averaged. Both these sets of ranks for each of the 7 components are shown in Table 11 - 28.

Table 11 - 28

Ranks of each of the seven components of the selected background and schools variables in terms of the magnitudes of each of the components with remaining variables

Variables	Rank By taking distribution of C's with other components	Rank By averaging rank from six pairs in which this component occurs.
1. Father's Occupation	1	1
2. Caste	2	2
3. School Management	3	3
4. Sex Composition	4	6
5. Religion	5	5
6. Mother's Occupation	6	4
7. Shift System	7	7

It will be noted from Table 11 - 28 that three components viz. 'Father's Occupation', 'Caste' and 'School Management' receive the same first three ranks in that order, by both the methods of ranking, Again, 'religion', and 'shift system' also receive the same rank by both the methods. There is a reversal of ranks for 'Sex Composition' and 'Mother's Occupation'. The rank difference co-efficient of correlation between the sets of rankings as found to be very high - .93 to be exact.

The above analysis has established the fact that two background factors, 'Father's Occupation' and 'Caste', and one school factor, viz. 'school Management', account for a good deal of the clustering to be seen among and between the seven selected family background and school variables. The other remaining four variables do not show any marked tendency towards clustering in any particular

pattern.

A composite Scale for Socio Economic Status

So far we have considered the seven different components of the family background separately and individually. There is at the same time a need for evolving some sort of a composite measure - reflecting the over-all socio-economic status of families whose children have been included in the sample. The task would be somewhat easier if all the seven different variables used in the present investigation were in at least interval scales, permiting to add the scores (either weighted or unweighted) from each scale, after some sort of transformation to equate variances and differences in mean of individual scales. However, in the present case, the situation is very different: of the seven different variables, only one, 'income' is measured in a strong, ratio scale Two variables, 'father's education' and 'mother's education' are rank order scales of a sort; we can say that the two variables, 'father's occupation' and 'mother's occupation' are also rank-order scales. But the remaining two variables, caste and religions are categorical scales, and until those are converted into some sort of rank-order scales, those cannot be combined with scores from the remaining five variables.

By looking into certain sociological realities of the Indian society which is under study, namely, the Western Bihar, we obtain certain leads which may be used to transfrom the purely qualitative categories of caste and religion into a combined caste-religion rank order scale, scores from which can then be used for combining with those from the remaining variables.

The core for this combined caste religion ~~xxx~~ scales is pointed by the caste variables categories themselves.

Scheduled caste is given a score of 1

Scheduled tribe is given a score of 2

Backward caste is given a score of 3

Upper caste is given a score of 4

Muslim is given a score of 3

Christian is given a score of 3

Sikh is given a score of 3

In eastern U.P. Muslims belong to two castes - Upper caste (Sheikhs, Khans, Sayeds etc.) and backward castes (Ansaris - weaver community etc.) In the present sample there were no upper caste Muslims who could be equated with upper caste Hindus to get a score of 4, hence they have been given scores of 3.

The same argument applies to converted Christian of this region, and also Sikhs, questioning reveals the original caste among Hindus to which they belonged - which justifies their being given a score of 3.

If this scheme of scoring of caste-religion is acceptable, the next step is to obtain a simple unweighted linear sum of the rank-order scores of the first five variables mentioned above. In the absence of a clear cut external criterion for judging over-all socio-economic status, the safest and simplest procedure is not to resort to any differential weighting of the variables of the composite scale scores, but take unweighted linear sums. The unweighted sums given to the different categories in each six variables of the composite have been listed in Table 11 - 29.

A linear composite score can be very easily obtained by taking the simple linear sum of the rank-order scores corresponding to the categories in each of the six variables listed in Table 11 - 12. This score has been given the name LINSES - derived from "Linear sums of socio-economic status" (determining) variables. The LINSES score will have a range from a minimum value of 2 to a maximum

Table 11 - 29

Rank order scores corresponding to different categories under each of the six families background variables

1 and 2 Father's Education / Mother's Education: Category	Score	3 and 4 Father's Occupation / Mother's Occupation: Category	Score	5 INCOME: Category	Score	6 RELIGION - CASTE: Category	Score
Illiterate	0	Unemployed	0				
Below Primary Pass	1	Unskilled manual workers, laborers	1	Below Rs.100	1	Scheduled Caste	1
Primary pass	2	Skilled and semi-skilled manual workers	2	Rs.100-200	2	Scheduled Tribes	2
Middle Pass	3	Clerical and sales workers	3	Rs.200-300	3	Backward Caste, Muslim, Sikh, Christian	3
High School pass	4	Proprietors, managers, lower level	4	Rs.300-500	4	Upper Caste	4
High School+ Special training Intermediate	5	Proprietors, Managers, middle level	5	Rs.500-700	5		
Graduate	6	Sub-Professional, technical owners of business	6	Rs.700-1000	6		
Post Graduate	7	Administrative executive proprietor, higher level managers	7	Rs.1000-1500	7		
		Higher Professional technical	8	Above 1500	8		

value of 42. A linses sum of 2 means a subject whose both parents are illiterate, and unemployed, have income of less than Rs. 100 per month, and belong to the scheduled caste. Likewise a family belonging to upper caste, with income exceeding Rs. 1500 per month, with both parents having postgraduate degrees and having Higher professional occupation will have a LINSES score of 42. The LINSES score can thus be taken as something equivalent to a socio-economic status score derived from comparable scales. It is different from other known scales purporting to measure socio-economic status in that no differential weighting has been used for each of the variable scores entering into the composite score. It will be interesting to study the validity of the LINSES measure against other scales purporting to measure socio-economic status.

Having described how LINSES scores can be computed for each subject, we may like to see how scores of this derived variable have been distributed among different groups of the entire respondents sample. The relevant findings are presented below.

Socio-economic status of parents of children in different schools

It will be interesting to find out how the LINSES scores are distributed among the 15 urban schools, and 16 rural schools. This frequency distribution for the urban schools has been shown in Table 11 - 30.

It will at once be noted that distribution of LINSES scores are very dissimilar for urban and rural samples. First, the variability of distribution among 15 schools in the urban sample is very great. The chi-square value for this distribution is found to be 230.71, which, with 56 degrees of freedom is significant well beyond .001 level.

The corresponding coefficient contingency, C is found to have a value of .66.

Table 11 - 30

Frequency distribution of LINSES scores among samples drawn from fifteen urban schools and sixteen rural schools.

I D No. of Schools	URBAN SCHOOLS LINSES SCORES 2-10	11-19	20-28	29-37	38-42	Total	ID No. of Schools	RURAL SCHOOLS 2-10	11-19	20-28	Total
01	0	3	12	4	0	19	16	4	10	2	16
02	0	11	11	2	0	24	17	2	15	1	18
03	3	9	7	0	0	19	18	7	11	1	19
04	12	9	1	0	0	22	19	13	19	1	33
05	13	3	0	0	0	16	20	15	10	0	25
06	11	8	0	0	0	19	21	2	10	1	13
07	13	7	0	0	0	20	22	6	13	2	21
08	10	8	2	0	0	20	23	6	9	1	16
09	2	19	2	0	0	23	24	5	10	3	18
10	10	13	3	0	0	26	25	2	6	0	8
11	5	10	0	0	0	15	26	3	11	0	14
12	6	13	0	0	0	19	27	3	12	0	15
13	11	6	0	0	0	17	28	9	15	1	25
14	0	3	16	6	2	27	29	13	11	0	24
15	5	7	3	0	0	15	30	7	16	1	24
							31	5	8	0	13
Total	101	129	57	12	2	301	Total	102	186	14	302

The situation is quite different with regard to rural sample. Here, the school-to-school variability is far less. The chi-square value from this distribution comes to only 35.91; this, with 30 degrees of freedom, is not significant even at .30 level. Whatever variability is there in the distribution of LINSES scores can be attributed to chance factors.

If we look closely at the distribution of LINSES score among the 16 urban schools, we will note that, a large part of the variability comes from three schools, viz. # 011, #021 and #4. These three private, unaided schools, catering to a clientele belonging to the more affluent section of the community have between themselves contributed 14 subjects to the urban sample. The distribution of LINSES scores becomes quite different if all subjects contributed by those three private schools are removed and shown separately. What the three distribution will look like are shown in Table 11 - 31, where for purposes of comparison, the distribution of LINSES scores for the rural schools are also shown.

Close examination of the distribution of LINSES scores in three types of schools viz. Urban unaided private, urban aided non-private, and rural aided, will reveal a few interesting things. First the socio-economic status level of the 70 subjects, from the three private, unaided schools, all located within the urban area, is substantially higher than that of the remaining 12 urban, aided schools, and 16 rural aided schools. Next the dissimilarity between the distributions of LINSES scores among the sample drawn from the 12 aided urban schools and 16 aided rural schools, is not very great. In fact, it is rather note-worthy that whereas in the urban sample (excluding the three affluent private schools) 43.7% of the sample belong to the lowest LINSES score class interval of 2 - 10, the same is 33.8% only in the rural sample. In the next higher LINSES class interval, viz. 11 - 19, the per centages are 48.5% for rural schools, and 61.6%

Tablo 11 - 31

Distribution of LINSES scores among privato unadidod, all aidod schools in the urban aroa, and all schools in the rural area.

Linses Scores	Urban Aroa: Private Unaidod School (N + 3) N	Percent	Remaining aided schools (N = 12) N	Porent	Rural aroa All aidod Schools (N = 16) N	Percent	All Schools N	Percent
2 - 10	0	0.0	101	43.7	102	33.8	203	33.7
11 - 19	17	24.3	112	48.5	186	61.6	315	52.2
20 - 28	39	55.7	18	7.8	14	4.6	71	11.7
29 - 37	12	17.1	0	0.0	0	0.0	12	2.0
38 - 42	2	2.1	0	0.0	0	0.0	2	0.3
	70		231		302		603	

few urban schools. Upto this level of LINSES score, the rural sample has a definite edge over the urban sample; only in the next higher LINSES score interval, viz. 20 - 28, we find that the per centage of the rural sample, 4.6% is smaller than that for the urban sample which is 7.8%.

How similar, these two distributions are is confirmed by the chi-square value computed from the same. This is found to be only 5.72 whcih with 3 degree of freedom fails to reach significance even at 20 per cent level. So we may safely conclude that in terms of the distribution of LINSES scores, the urban sample and the rural sample are quite similar, if 70 subjects all drawn from the three private unaided urban schools are excluded from the urban sample; these 70 subjects belong to a distinctly higher socio-economic status level.

From the distribution characteristics of the composite LINSES score among different sections of the entire sample of 603 subjects, it appears that it may prove to be a reasonably satisfactory and workable instrument for measuring socio-economic status level. Three advantages in using such a linear composite measure are apparent.

1. The composite LINSES scores is derived by taking into account all the 7 components of the family background, all of which could be ascertained objectively and empirically. Only one component, viz. income, cannot be assessed with any degree of precision and accuracy. In the remaining six componenets the element of judgement and objectivity is minimum. These objectivity and precision of the component measures entering into the composite LINSES measure are valuable features.

2. The fact that the LINSES measures discriminate between subjects drawn from schools well known for catering to the upper echelons of the society and subjects drawn from school which are open to students irrespective of class, caste and economic status, is another important

and crucial features of this measure. True, in this particular study, this discrimination is seem in an aposteriori manner. The absolute validity of the measure has to be established by drawing samples independently from two types of schools and then examining the two distribution.

3. The comparative case with which the LINSES scores can be computed is another advantage. No differential weighting is used. Such differential weighting, unless established objectively and accurately, makes all such composite measure of controversial value. Even when such differential weights are established objectively and accurately, the measures are usually found to be relevant for narrowly delimited regions only - characterised by strong cultural homogeneity. Such instruments, with differential weighting of components, can hardly be used universally, in all regions characterised by cultrual heterogeneity.

Subsequent data analysis will be very greatly facilitated, and economy of effort effected, by making use of this composite LINSES scores, rather than the separate scores on the seven different components that enter the composite.

This completes the description of the family background characteristics of the sample of 603 students who have been studied in this investigation.

CHAPTER-12

PERFORMANCE IN INTERVENING VARIABLES

In the present study, there are four variables which have been conceptualized to function as " intervening" variables. These are :

(1) Intelligence
(2) Social maturity
(3) Moral-ethical development
(4) Social acceptance

For measuring 'intelligence' , the Porteus maze test was used, from which two different measures were obtained— one is the "Mental Age", and the other, derived from the "mental age" score, by dividing it with the Chronological age of the subject, giving an Intelligence Quotient score:

In this chapter, how different groups of subjects have scored in each of these five variables will be described. The entire group of 603 subjects can be broken up into subgroups by using a variety of classificatory principles. One principle may be to start with bigger groups and go to smaller and smaller, and more homogenous subgroups. In such a scheme the largest two sub-groups are the rural sample and the urban sample; next, we have the three grades, I, II and V in each location sub-group. Again, within each grade, there are two sex-groups, male and female. In this classificatory scheme the fifteen schools of the urban samples are considered together, likewise, the sixteen schools of the rural sample are considered together. Undoubtedly there are "between schools" differences. Whether such 'between schools' differences are significant, (as compared to "within schools" variables) can be tested later At this stage, however, the data from all 15 schools of the urban area, and all the 16 schools of the rural area, will be pooled. Statistical descriptions of the performance of the subjects, in the five different measures, follow, variable-wise.

1. Mental Age. Close inspection of the 'mental age' scores obtained by the entire sample of 603 subjects revealed that the lowest was 4.00 years and the highest was 17.00 years. Uniform sized class intervals could there be set up which would be useful for all types of possible subgroupings.

The frequency distribution of 'mental age' scores, for subjects of grade I, for urban and rural schools are shown in Table 12-1.

Close examination of data presented in Table 12-1 will be rewarding. It will be seen that the male children have a slightly higher mental age than the female children, both for urban and rural samples. Again, the rural children as a group have higher average mental age than the urban

Table 12-1

Frequency distributions of mental age scores for different groupings of subjects of grade I

Mental Age class inter	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	Urban+Rural Male	Urban+Rural Female	Urban+Rural Total
1 .143-17.0	0	0	0	0	0	0	0	0	0
13.286	1	0	1	0	0	0	1	0	1
11.429	1	1	2	2	1	3	3	2	5
9 .571	0	0	0	0	0	0	0	0	0
7 .714	8	3	11	3	1	4	11	4	15
5 .857	20	10	30	43	14	57	63	24	87
4 .000	36	28	64	13	19	32	49	47	96
Total	66	42	108	61	35	96	127	77	204
Mean	6.03	5.52	5.83	6.54	5.79	6.27	6.28	5.64	6.13
S.D.	1.897	1.604	1.798	1.418	1.357	1.436	1.732	1.495	1.700

group-- this holds for the males, females and the whole group. At this stage, there is no intention to test the significance of the mean differences. Since the age range of the children was 5½ to 6½ (as recorded in the school registers), the range of average mental age, from 5.52 years to 6.54 years, appears to be very satisfactory, showing the adequacy of the tool itself.

Next, let us see how the distribution of 'mental age' is like in the next age-grade, viz., Grade II. This is shown in Table 12-2.

It will be seen from Table 12-2, that the trend shown for Grade I is repeated for Grade II also. The male group has a slight edge over the female group, both in the urban and the rural samples. Again, rural children, both male and female, and as a whole, have higher average 'mental age' scores than the urban children.

Again, since the age range of the children in this grade was 6½ to 7½ years, (as recorded in school registers), the obtained mental age range, of 6.76 years (female, urban) to 7.48 (male, rural), appears to be quite along expected lines.

Table 12-2

Frequency distribution of mental age scores for different groupings of subjects of grade II

Mental Age class inter	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	Urban + Rural Male	Urban + Rural Female	Urban + Rural Total
15.143-17.0	1	0	1	0	0	0	1	0	1
13.286	1	0	1	1	0	1	2	0	2
11.429	1	2	3	4	1	5	5	3	8
9.571	2	0	2	2	2	4	4	2	6
7.714	12	9	21	18	2	20	30	11	41
5.857	23	14	37	31	14	45	54	28	82
4.000	17	14	31	10	7	17	27	21	48
Total	57	39	96	66	26	92	123	65	178
Mean	7.06	6.76	6.94	7.48	7.04	7.35	7.28	6.87	7.14
S.D.	2.396	1.835	2.180	1.962	2.005	1.973	2.174	1.905	2.081

This takes us to the consideration of the distribution of 'mental age' scores for sample for Grade V. The frequency distributions for Grade V are shown in Table 12-3.

Table 12-3

Frequency distributions of 'mental age' scores for different groupings of subjects of grade V

Mental Age class inter	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	Urban + Rural Male	Urban + Rural Female	Urban + Rural Total
15.143-17.0	3	2	5	4	0	4	7	2	9
13.286	13	5	18	14	2	16	27	7	34
11.429	12	4	16	19	7	26	31	11	42
9.571	14	3	17	11	3	14	25	6	31
7.714	14	9	23	24	8	32	38	17	55
5.857	9	8	17	10	11	21	19	19	38
4.000	0	1	1	1	0	1	1	1	2
Total	65	32	97	83	31	114	148	63	211
Mean	10.93	10.14	10.67	10.84	9.29	10.42	10.88	9.72	10.53
S.D.	2.700	3.186	2.877	2.709	2.689	2.780	2.705	2.952	2.823

It will be at once seen that one trend -- the higher average 'mental age' score of boys than that of girls, is retained in Grade V also. But the other trend, about the different between rural and urban children, is reversed in this grade, here both urban boys, and urban girls, have higher average 'mental age' scores than rural boys and rural girls, respectively. Here again, we know the age range of the subjects was $9\frac{1}{2}$ to 11 year, as recorded from the school registers. The minimum average mental age for any group is 10.93, (male, urban), which fits in nicely with expectations. All the different group means have been brought together in Table 12-4.

Table 12-4

Distribution of mean 'mental age' scores for different groups of all the three grades

Grade and Sex		Urban N	Urban Mean	Rural N	Rural Mean	Urban + Rural N	Urban + Rural Mean
Grade I	Male	66	6.03	61	6.54	127	6.28
	Female	42	5.52	35	5.79	77	5.64
	Total	108	5.83	96	6.27	204	6.13
Grade II	Male	57	7.06	66	7.48	123	7.28
	Female	39	6.76	26	7.04	65	6.87
	Total	96	6.94	92	7.35	188	7.14
Grade V	Male	65	10.93	83	10.84	148	10.88
	Female	32	10.14	31	9.29	63	9.72
	Total	97	10.67	114	10.42	211	10.53
All grade:	Male	188	8.04	210	8.54	398	8.30
	Female	113	7.26	92	7.32	205	7.28
	Total	301	7.74	302	8.16	603	7.95

S.D. = 2.97

We pass on to the consideration of the next variable, that is Intelligence Quotient.

2. <u>Intelligence Quotient - IQ.</u> The measure called 'intelligence quotient' or IQ in short is measured by dividing the obtained mental age by the chronological age of the subject, and then multiplying the quotient by hundred, and rounding off to drop all decimals.

In this study the chronological age of the subject had been recorded from the admission register maintained by the school. At the outset, it has to be admitted that the recorded ages of children are by no means accurate. Many times, fictitious dates of birth are recorded, which usually make a child's age lower than what it actually is. Many times, dates at random are recorded as birth dates; because the parents or guardians may not be sure about that. Many children's birth dates are recorded as falling on 1st January, or 1st July. It is therefore reasonable to assume that the ages are not very accurate, and therefore, the derived IQ measures are also not very accurate. These measures are at best taken as suggestive.

The frequency distributions of IQ measures for different groupings of Grade I subjects are shown in Table 12-5.

Table 12-5

Frequency distributions of IQ scores of different groupings of subjects of Grade I

IQ class Intervals	URBAN Malo	Fomalo	Total	RURAL Male	Female	Total	Urban + Rural Male	Female	Total
153-29-170.0	2	1	3	2	1	3	4	2	6
136.57	3	0	3	0	0	0	3	0	3
119.86	6	3	9	4	1	5	10	4	14
103.14	9	3	12	17	5	22	26	8	34
86.43	12	6	18	26	10	36	38	16	54
69.71	21	15	36	8	14	22	29	29	58
53.00	13	14	27	4	4	8	17	18	35
Total	66	42	108	61	35	96	127	77	204
Moan	92.26	84.12	89.09	99.00	86.86	94.94	95.50	85.82	91.84
S.D.	26.78	22.91	25.54	20.67	19.37	20.81	25.58	21.37	23.43

After taking into account, the inherent undependability of the derived IQ measures, we note two distinct trends in the distributions shown in Table 12-5.

(1) First, the male samples have higher average IQ than the corresponding female samples, in the urban and rural schools. The difference between the pairs of means appears to be substantial -- 8 IQ points for the urban pupils, and 12 IQ points for the rural children.

(2) The average IQ for the rural samples appear to be somewhat higher than that for the urban samples - for homogonous sex groups as well as for the total.

(3) The average IQ values are uniformly below 100, it goes to the lowest value of 84.12 for urban, females, and reaches its highest value to 99.00 for rural, males. This is somowhat surprising. On logical grounds, we would expect the obtained IQ values to be inflated, due to the known tendency for lowering the ages of the wards while enrolling them in schools. Even after this artifactual inflation of certain IQ values, the average is below 100.

(4) The positive skew of the IQ distribution is also quite pronounced. While there is a crowding at the lower ends, there are long tails towards the higher ends in each of the distributions, so that we find 23 cases (about 11.5%) who have IQ's higher than 120.

Let us now see what the IQ distributions are like for Grade II subjects. Those have been shown in Table 12-6.

Table 12-6

Frequency distributions of IQ scores of different groupings of subject of grade II

IQ class Intervals	URBAN Male	Female	Total	RURAL Male	Female	Total	URBAN + RURAL Male	Female	Total
153.29-170.0	3	0	3	2	1	3	5	1	6
136.57	0	2	2	5	1	6	5	3	8
119.86	4	0	4	2	1	3	6	1	7
103.14	8	9	17	15	3	18	23	12	35
86.43	16	12	28	26	11	37	42	23	65
69.71	15	4	19	9	4	13	24	8	32
53.00	11	12	23	7	5	12	18	17	35
Total	57	39	96	66	26	92	123	65	188
Mean	92.95	88.82	91.27	98.77	92.92	97.12	96.07	90.62	94.13
S.D.	25.57	22.96	24.51	24.95	25.75	25.18	25.24	24.11	24.84

A perusal of distributions and statistics exhibited in Table 12-6 will make it clear that the trends here are similar to that shown by subjects of Grade I. The male groups have higher average IQ than female groups, in rural, urban, and rural + urban combined samples. Again, the average IQ for rural groups, both male and female, are higher than those for the

urban groups. One difference between Grade I and Grade II distributions should be noted: the difference between the lowest group average of IQ 88.12 for urban, female pupils, and the highest group average of IQ-98.77, has been reduced, from 14.88 IQ points to 9.95 IQ points only. This has some psycho-social implications.

We next consider the distribution of IQ scores for different groupings of Grade V. These are shown in Table 12-7.

Table 12-7

Frequency distribution of IQ scores for different groupings of subjects of Group V

IQ class Intervals	URBAN Male	Female	Total	RURAL Male	Female	Total	URBAN + RURAL Male	Female	Total
153.29-170.0	1	2	3	4	0	4	5	2	7
136.57	11	2	13	9	1	10	20	3	23
119.86	9	4	13	15	6	21	24	10	34
103.14	18	5	23	12	2	14	30	7	37
86.43	7	6	13	21	6	27	28	12	40
69.71	16	5	21	17	8	25	33	13	46
53.00	3	8	11	5	8	13	8	16	24
Total	65	32	97	83	31	114	148	63	211
Mean	107.42	97.59	104.18	106.86	92.55	102.96	107.10	95.11	103.52
S.D.	25.56	30.94	27.68	27.13	27.03	27.73	26.45	29.35	27.70

As in the case of 'mental age' there is one reversal of trends for IQ distributions also: the average IQ for urban males is now found to be higher than that for rural males, though the difference is small - only 0.58 IQ points. Likewise the urban female IQ average (97.59) is substantially greater than the rural female IQ average (92.55). The urban sample as a whole has higher average IQ compared to the rural sample.

The means for all the three grades can now be considered together. This is done in Table 12-8.

Table 12 - 8.

Distribution of mean intelligence quotients' for different groups of all three grades.

Grade and Sex		URBAN N	URBAN Mean	RURAL N	RURAL Mean	URBAN+RURAL N	URBAN+RURAL Mean
Grade I	Male	66	92.26	61	99.00	127	95.50
	Female	42	84.12	35	86.86	77	85.82
	Total	108	89.09	96	94.94	204	91.84
Grade II	Male	57	92.95	66	98.77	123	96.07
	Female	39	88.82	26	92.92	65	90.62
	Total	96	91.27	92	97.12	188	94.13
Grade V	Male	65	107.42	83	106.86	148	107.10
	Female	32	97.59	31	92.55	63	95.11
	Total	97	104.18	114	102.96	211	103.52
All Grades	Male	188	97.71	210	102.03	398	99.99
	Female	113	89.53	92	90.87	205	90.13
	Total	303	94.63	302	98.63	603	96.64
						S.D. =	25.95

What is noteworthy, is the upward trend in the average IQ values for most groups as we got higher grades. Both male samples of rural and urban areas have IQ averages higher than 100; even though the IQ averages for both female samples of the urban and rural areas are lower than 100, the rural sample as a whole and the urban sample as a whole, have IQ averages greater than 100. Again the superiority of the average IQ for males is prominent, both for urban and rural groups.. -- the difference being about 10 points among the urban samples and 14 points among the rural samples.

Now, we pass on tot the consideration of the next intervening variable.

3. Social Maturity

This variable was found to have the following range; the minimum 'social maturity' score was 4.30 and the maximum was 15.54, so that the entire distribution has a range of 13.24 points. The frequency distributions of

'social maturity' scores for different groups of subjects in Grade I have been shown in Table 12-9.

Table 12 - 9.

Frequency distribution of Social maturity scores for different groupings of subjects of Grade I.

Social Maturity Score class Interval	URBAN Male	Female	Total	RURAL Male	Female	Total	URBAN + RURAL Male	Female	Total.
13.93-15.540	11	0	11	0	0	0	11	0	11
12.33	13	7	20	33	12	45	46	19	65
10-72	17	14	31	15	8	23	32	22	54
9-12	13	8	21	8	12	20	21	20	41
7.51	8	7	15	5	2	7	13	9	22
5.91	4	2	6	0	1	1	4	3	7
4.30	0	4	4	0	0	0	0	4	4
Total	66	42	108	61	35	96	127	77	204.
Mean	11.28	10.11	10.82	11.88	11.17	11.62	11.69	10.59	11.19
S.D.	2.16	2.38	2.31	1.43	1.64	1.54	1.84	2.01	1.98

The distributions of 'social maturity' scores shown in Table 12.4 have a few interesting features. Most of the distributions are negatively skewed, with a lot of clustering towards the high end. This is less pronounced for the urban females, and the rural samples, both males and females. Again, both the sex groups of the rural schools have slightly higher average 'social maturity' scores than their urban counterparts.

Next, let us consider the frequency distributions of 'social maturity' scores for Grade II. These distributions are shown in Table 12-10.

The distributions shown in Table 12-10, for Grade II show the same trend as shown by Grade I, save one important difference: the girl's sample of Grade II has a higher average 'social maturity' score compared to their male counterpart -- in fact this group has the highest average among all the four different sex groups. What is somewhat surprizing is that all the averages, save this one, is lower for Grade II groupings than for Grade I groupings.

Table 12-10.

Frequency distribution 'social maturity' scores for different groupings of subjects of Grade II.

Social Maturity Score Class interval	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN + RURAL Male	URBAN + RURAL Female	URBAN + RURAL Total
13.93-15.54	3	0	3	0	2	2	3	2	5
12.33	10	15	25	30	10	40	40	25	65
10.72	22	3	25	22	8	30	44	11	55
9.12	12	12	24	11	4	15	23	16	39
7.51	6	3	9	3	2	5	9	5	14
5.91	4	3	7	0	0	0	4	3	7
4.30	0	3	3	0	0	0	0	3	3
Total	57	39	96	66	26	92	123	65	188
Mean	10.93	10.69	10.83	11.74	12.06	11.83	11.37	11.29	11.3[illegible]
S.D.	1.92	2.69	2.26	1.29	1.55	1.37	1.61	2.30	1.8[illegible]

If sex is ignored, the averages for the entire sample, for urban, for rural, and for urban and rural taken together, fall into expected patterns. But the superiority of Grade II averages over Grade I averages is only slight.

Lastly, the distribution of 'social maturity' scores for different groupings in Grade V are shown Table 12-11.

The distributions for different groupings in Grade V are a little erratic. However, the differences between overall sample means, if sex is ignored, are not great. One point is noteworthy: boys of Grade V have a higher average 'social maturity' score, (12.08), as compared to only 10.86 for girls of the same grade - in the rural schools But the girls of the urban schools have a slightly higher average 'social maturity' score than their male counterparts.

In order to have an overview of all the sub-group means, these have brought together in Table 12-12, the arrangement being somewhat different, so as to facilitate comparisons.

Table 12 - 11

Frequency distribution of 'social maturity' socres for different groupings of Grade V.

Socail Maturity Scores Class Interval.	URBAN Male	Female	Total	RURAL Male	Female	Total	URBAN + RURAL Male	Female	Total
13.93-15.54	1	6	7	4	3	7	5	9	14
12.23	29	9	38	38	6	44	67	15	82
10.72	15	7	22	26	9	35	41	16	57
9.12	9	8	17	10	7	17	19	15	34
7.51	6	2	8	5	4	9	11	6	17
5.91	5	0	5	0	1	1	5	1	6
4.30	0	0	0	0	1	1	0	1	1
Total	65	32	97	83	31	114	148	63	211
Mean	11.33	11.95	11.54	12.08	10.86	11.75	11.75	11.41	11.65
S.D.	2.11	1.74	2.01	1.53	2.20	1.81	1.81	1.98	1.90

Table 12 - 12.

Distribution of means of 'social maturity scores' for different groups of subjects in all the three grades.

Grade and Sex		URBAN N	Mean	RURAL N	Mean	URBAN + RURAL N	Mean
Grade I	Male	66	11.28	61	11.88	127	11.69
	Female	42	10.11	35	11.17	77	10.59
	Total	108	10.82	96	11.62	204	11.19
Grade II	Male	57	10.93	66	11.74	123	11.37
	Female	39	10.69	26	12.06	65	11.29
	Total	96	10.83	92	11.83	188	11.32
Grade V	Male	65	11.33	83	12.08	148	11.75
	Female	32	11.95	31	10.86	63	11.41
	Total	97	11.54	114	11.75	211	11.65
All Grades	Male	188	11.19	210	11.91	398	11.57
	Female	113	10.84	92	4.32	205	11.05
	Total	301	11.05	302	11.72	603	11.39

A close examination of mean values of 'social maturity' scores for different groups will bring out two features worthy of note. First, the difference between various values is usually of low magnitude - the lowest

average for any group is 10.11 (female, urban, Grade I), and the highest average for any group is 12.08 (male, rural, grade V) - which is only a difference of 1.97 points. Secondly, the rural sub-samples, and the entire group of subjects seem to have a systematic edge over their urban counterparts, in the scores for 'social maturity'. This trend holds for all three averages for the three grades, ignoring sex-groups: comparison between 10 pairs of averages shows that in nine such pairs, the rural group average is greater in magnitude than its urban counterpart. This is a very important finding - because it is somewhat contrary to our ordinary expectations. We will have to go into its implications later.

We now turn to the considerations of the next intervening variable, viz Moral-ethical development.

4. Moral-ethical Development. This intervening variable was sought to be measured by the special scale named, 'moral relativism'. This instrument yields a composite score. It was found that the minimum score was 0 and the highest score was 26.00. The frequency distributions of 'moral relativism' scores for different groups of subjects of grade I are shown in Table 12-13.

Perusal of the distributions and averages of 'moral relativism' scores for Grade I groupings will show, that the urban samples have higher averages than their rural counterparts. Again, whereas in the urban schools, the male pupils have a higher average 'moral relativism' score, the situation is reversed in the rural school, where the girls have a higher average 'moral relativism' score than the boys. Girls' scores of the rural school are characterized by greater variability also.

Let us now consider the same types of distributions for Grade II. These are shown in Table 12-14.

The distributions of Table 12-14 show one interesting trend -- the averages for the girls are invariably higher than those of the boys, both in urban and rural

Table 12-13.

Frequency distributions of 'moral relativism' scores for different groupings of Grade I.

Moral Relativism Score Class Interval.	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN + RURAL Male	URBAN + RURAL Female	URBAN + RURAL Total
22.29-26.00	0	0	0	0	0	0	0	0	0
18.57	1	1	2	0	0	0	1	1	2
14.86	12	6	18	3	7	10	15	13	28
11.14	29	17	46	19	6	25	48	23	71
7.43	21	12	33	32	17	49	53	29	82
3.71	2	6	8	6	5	11	8	11	19
0.00-	1	0	1	1	0	1	2	0	2
Total	66	42	108	61	35	96	127	77	204
Mean	12.44	11.79	12.19	10.30	10.91	10.52	11.41	11.39	11.40
S.D.	3.35	3.33	3.34	2.81	3.25	2.97	3.13	3.29	3.07

Table 12-14.

Frequency distributions of 'moral relativism' scores for different groupings of subjects of Grade II

Moral Relativism Score Class Intervals.	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN + RURAL Male	URBAN + RURAL Female	URBAN + RURAL Total
22.29-26.00	0	0	0	0	0	0	0	0	0
18.57	1	4	5	0	1	1	1	5	6
14.86	9	11	20	14	8	22	23	19	42
11.14	17	11	28	23	8	31	40	19	59
7.43	24	12	36	26	8	34	50	20	70
3.71	5	1	6	3	1	4	8	2	10
0.00	1	0	1	0	0	0	1	0	1
Total	57	39	96	66	26	92	123	65	188
Mean	11.47	13.38	12.25	11.80	12.96	12.13	11.65	13.22	12.19
S.D.	3.42	3.55	3.58	2.82	3.26	2.98	3.11	3.44	3.30

schools. Again, while rural boys have slightly higher average 'moral relativism' score, than urban boys, the reverse is true for girls.

We can now go on to a consideration of the distributions of the 'moral relativism' scores obtained by

subjects of Grade V. These distributions are shown in Table 12-15.

It will be noted that the average for boys in the urban schools is now highest, followed by that for urban girls; the rural boy's average is still further lower, and the rural girl's average is the lowest.

The systematic variation of the 'moral relativism' score means as one goes from Grade I through Grade V, is more easily seen from Table 12-16, where all the sub-group means have been brought together.

It will be noted that there is a systematic increase in the value of average 'moral relativism' score, as one goes from grade I through Grade II to Grade V, both for urban and rural samples. Again, if sex-grouping is ignored, the urban students seem to have a slight advantage over their counterparts in the rural areas, for each of the three grades. No systematic trend is apparent with regard to one sex being better than the other.

With this, we can turn to the consideration of the last intervening variable, namely, social acceptance.

5. Social Acceptance. This variable was sought to be measured by administering a simple, 'near _ sociometric' type of instrument, called, 'name your friends' test. From the number of choices received by the members of the sample, from his or her classmates (or sectionmates), his 'sociometric status index' was calculated by the method of weighted summation of the three choices. First, second and third choices received the 3,2,and 1 weightage respectively.

The distributions of 'sociometric status' indices for different groupings in Grade I are shown in Table 12-17.

The only point worthy of note in the various distributions shown in Table 12-17 is their extreme positive skew. The crowding of scores towards the lower end of the scale characteristics all the distributions, showing that the samples did not contain many popular stars among them.

Table 12-15.

Frequency distribution of 'moral relativism' scores for different groupings of subjects of Grade V.

Moral Relativism score Class Interval.	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN + RURAL Male	URBAN + RURAL Female	URBAN + RURAL Total
22.29-26.00	2	1	3	1	0	1	3	1	4
18.57	16	6	22	8	1	9	24	7	31
14.86	18	9	27	34	12	46	52	21	73
11.14	13	6	19	26	10	36	39	16	55
7.43	14	8	22	12	6	18	26	14	40
3.71	2	2	4	2	2	4	4	4	8
0.00	0	0	0	0	0	0	0	0	0
Total	65	32	97	83	31	114	148	63	211
Mean	15.42	14.63	15.15	14.53	13.39	14.22	14.92	14.02	14.74
S.D.	4.61	4.72	4.63	3.31	3.54	3.40	3.93	4.18	4.01

Table 12-16.

Distribution of mean of 'moral relativism' scores among different groups of subjects in all the thre grades

Grade and Sex		URBAN N	URBAN $\bar{X}$	RURAL N	RURAL $\bar{X}$	URBAN + RURAL N	URBAN + RURAL $\bar{X}$
Grade I	Male	66	12.44	61	10.30	127	11.41
	Female	42	11.79	35	10.91	77	11.39
	Total	108	12.19	90	10.52	204	11.40
Grade II	Male	57	11.47	66	11.80	123	11.65
	Female	39	13.38	26	12.96	65	13.23
	Total	96	12.25	92	12.13	188	12.19
Grade V	Male	65	15.42	83	14.53	148	14.92
	Female	32	14.63	31	13.39	63	14.02
	Total	97	15.15	114	14.22	211	14.74
All Grades	Male	188	13.17	210	12.44	398	12.79
	Female	113	13.14	92	12.33	205	12.77
	Total	301	13.16	302	12.41	603	12.78

S.D. = 3.82

The distributions of 'sociometric status' indices for different groupings in Grade II are shown in Table 12-18.

Table 12-17.

Frequency distributions of 'sociometric status' indices for different groupings of Grade I.

Sociometric Status Index Class interval.	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN + RURAL Male	URBAN + RURAL Female	URBAN + RURAL Total
24.17–28.20	0	0	0	0	0	0	0	0	0
20.14	0	0	0	0	0	0	0	0	0
16.11	0	0	0	0	0	0	0	0	0
12.09	1	0	1	1	0	1	2	0	2
8.06	4	3	7	3	0	3	7	3	10
4.03	12	10	22	11	6	17	23	16	39
0.00	49	29	78	46	29	75	95	58	153
Total	66	42	108	61	35	96	127	77	204
Mean	2.70	2.77	2.73	2.34	1.89	2.18	2.54	2.37	2.47
S.D.	3.29	3.08	3.20	3.25	2.32	2.94	3.27	2.77	3.08

Table 12-18.

Frequency distributions of 'sociometric status' indices for different groupings of Grade II.

Sociometric status Indices Class intervals.	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN + RURAL Male	URBAN + RURAL Female	URBAN + RURAL Total
24.17–28.20	0	0	0	0	0	0	0	0	0
20.14	0	0	0	0	1	1	0	1	1
16.11	0	0	0	1	0	1	1	0	1
12.09	1	1	2	0	1	1	1	2	3
8.06	4	1	5	1	1	2	5	2	7
4.03	6	9	15	12	5	17	18	14	32
0.00	46	28	74	52	18	70	98	46	144
Total	57	39	96	66	26	92	123	65	188
Mean	2.35	2.86	2.56	2.62	3.73	2.93	2.49	3.21	2.74
S.D.	3.23	3.03	3.14	3.19	4.76	3.70	3.02	3.82	3.43

In the distributions of 'sociometric status' indices for Grade II, there are two consistent trends: (1) the females have higher averages than their male counterparts, in both urban and rural samples; and (2) rural sample have higher averages than their urban counterparts.

Table 12-19

Frequency distribution of 'sociometric Status' indices for different groupings of Grade V.

Sociometric Status index Class interval.	URBAN			RURAL			URBAN + RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
24.17-28.20	1	0	1	0	0	0	1	0	1
20.14	0	0	0	2	0	2	2	0	2
16.11	4	1	5	1	0	1	5	1	6
12.09	6	1	7	4	2	6	10	3	13
8.06	4	1	5	8	4	12	12	5	17
4.03	5	11	16	13	4	17	18	15	33
0.00	45	18	63	55	21	76	100	39	139
Total	65	32	97	83	31	114	148	63	211
Mean	4.82	4.00	4.55	4.18	3.80	4.07	4.46	3.89	4.29
S.D.	6.24	4.07	5.61	4.79	4.34	4.66	5.47	4.20	5.12

Table 12-20

Distribution of mean 'sociometric status' indices among different groups of subjects in all three grades.

Grade and Sex		URBAN N	$\bar{X}$	RURAL N	$\bar{X}$	URBAN + RURAL N	$\bar{X}$
Grade I	Male	66	2.70	61	2.34	127	2.54
	Female	42	2.77	35	1.89	77	2.37
	Total	108	2.73	96	2.18	204	2.47
Grade II	Male	57	2.35	66	2.62	123	2.49
	Female	39	2.86	26	3.73	65	3.21
	Total	96	2.56	92	2.93	188	2.74
Grade V	Male	65	4.82	83	4.18	148	4.46
	Female	32	4.00	31	3.80	63	3.89
	Total	97	4.55	114	4.07	211	4.29
All Grades	Male	188	3.86	210	3.15	398	3.24
	Female	113	3.15	92	3.05	205	3.11
	Total	301	3.26	302	3.12	603	3.19
						SD =	4.07

The distributions of 'sociometric status' indices for differents groupings in Grade V are shown in Table 12-19.

The trends that were exhibited by different groupings in Grade II are completely reversed by groupings in Grade V: males have higher averages than females, and urban groups have higher averages than rural groups.

The systematic variations in the magnitude of average 'sociometric status' indices, from one subgroup to another can be seen better when these are brought together. This has been done in Table 12-20.

Several interesting trends may be underlined from Table 12.20. First is the substantial increase in the average sociometric status indices from Grade I and II to Grade V, which holds more consistently in the rural groups than for the urban groups. Secondly, the girls included in the sample usually have scored lower than their male counterparts. There are a few exceptions too: for example, females of grade II both in ~~xx~~ urban and rural schools have higher averages than their male counterparts. Thirdly, what is not clear from Table 12-20, the fact that there is considerable variability in the distribution of sociometric status scores, has to be kept in mind. That is, in most groups, only a few stray sociometric leaders appear to have been selected.

With this we come to the end of our description of the performance of the subjects in the five intervening variables. We are now in a position to consider how the same subjects have performed in the tests constituting the dependent variables. This we do in the next chapter.

Chapter 13

Performance in Dependent Variables:

(1) Achievement in Hindi

The achievement tests in Hindi, for each of the three grades, were so fashioned that, it yielded three sub-test scores, and total score, obtained by summing the three sub-test scores. Of course, the contents of these tests were different from grade to grade, with only one sub_test, sub-test III being common to both grade I and grade II. For this reason, the question of comparability between grades does not arise, because a common scale was not being used. The performances should, therefore, be considered for each grade separately.

The frequency distributions of achievement scores in sub-test I of the Hindi achievement test for different groupings in Grade I are shown in Table 13 - 1.

Table 13 - 1

Frequency distributions of scores in sub-test I of the achievement test in Hindi of different groupings of grade I

Scores in sub-test I Class Intervals	URBAN			RURAL			URBAN + RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
31.71-37.00	0	0	0	0	0	0	0	0	0
26.43	10	7	17	14	9	23	24	16	40
1.14-	8	8	16	12	4	16	20	12	32
15.86-	9	8	17	5	3	8	14	11	25
10.57-	9	9	18	4	1	5	13	10	23
5.29-	8	3	11	3	2	5	11	5	16
0.00-	22	7	29	23	16	39	45	23	68
Total	66	42	108	61	35	96	127	77	204
Mean	12.85	16.64	14.32	14.25	13.06	13.81	13.52	15.01	14.10
S.D.	10.32	9.37	10.09	11.78	12.53	12.01	11.39	10.92	11.03

It will be seen that all the distributions are u-shaped and bimodal - with peacks on the lower and higher ends of the scale. Otherwise, there is no clear-cut trend from group to group, either in terms of sex, or in terms of location of schools. Urban males have lowest average, fo-

followed by rural females, then rural males, and last is urban females.

The distribution of scores in the sub-Test II of the language achievement test are shown in Table 13-2.

Table 13-2.

Frequency distributions of scores in sub-test II of the Achievement Test in Hindi of different groupings of grade I

Scores in sub-test II Class Intervals	URBAN Male	Female	Total	RURAL Male	Fe-male	Total	URBAN + RURAL Male	Female	Total
41.14-48.00	0	0	0	0	0	0	0	0	0
34.26-	0	0	0	0	0	0	0	0	0
27.43-	0	0	0	0	0	0	0	0	0
20.57-	0	0	0	0	0	0	0	0	0
13.71-	13	12	25	12	9	21	25	21	46
6.86-	12	11	23	11	4	15	23	15	38
0.00-	41	19	60	38	22	60	79	41	120
Total	66	42	108	61	35	96	127	77	204
Mean	5.47	8.02	6.46	5.11	5.57	5.28	5.30	6.91	5.91
S.D.	6.28	6.64	6.51	6.24	6.68	6.37	6.26	6.66	6.44

Perusal of figures shown in Table 13-2 will indicate the overall trend of the distribution of group means for sub-test II scores. Both in urban and rural schools, the girls seem to have done consistently better than the boys. The urban sample as a whole appears to have done better than the rural sample.

The frequency distributions of scores in sub-test III, for different groupings of Grade I are shown in Table 13-3.

The skewness of the distribution has become more pronounced for scores in sub-test III, for all the sub-samples. The trend shown for sub-test II scores is repeated, even more strongly in sub-test III scores: the female groups are distinctly better than their male counterparts, in urban as well as rural schools. Again, the urban boys as well as girls have scored better than their rural counterparts.

Table 13-3.

Frequency distributions of scores in sub-test III of the Achievement Test in Hindi of different groupings in Grade I

Scores in sub-test III Class Intervals	URBAN Male	Female	Total	RURAL Male	Female	Total	URBAN + RURAL Male	Female	Total
41.14-48.00	8	5	13	0	2	2	8	7	15
34.26-	3	6	9	2	4	6	5	10	15
27.43-	4	4	8	7	3	10	11	7	18
20.57-	4	5	9	7	1	8	11	6	17
13.71-	2	3	5	2	1	3	4	4	8
6.86-	3	3	6	5	2	7	8	7	13
0.00-	42	16	58	38	22	60	80	38	118
Total	66	42	108	61	35	96	127	77	204
Mean	11.62	18.98	14.48	9.02	11.43	9.90	10.37	15.54	12.24
S.D.	17.28	17.29	17.58	12.56	16.45	14.06	15.19	16.91	16.01

The total of the three sub-test scores was obtained for each subject, giving a total score in Hindi achievement test. The various distributions for this total scores in Hindi achievement are shown in Table 13-4.

Several interesting points are worth underlining in the distributions for total scores in the Hindi achievement test shown in Table 13-4. First, the difference between mean scores for urban males, rural males, and rural females, is very slight. But the mean for urban female group is quite high. Due to this factor alone, the mean for the urban sample as a whole is larger than that for the rural sample.

In order to have a clear over-view of the way that the magnitudes of the different group means vary, in the different sub-tests, and the total score, for grade I children, these are shown together in Table 13-5.

Close examination of the mean values given in Table 13-5 will at once point out that the urban groups generally, and urban females specially, have scored higher than their counterparts in the rural groups. Whereas the

Table 13-4.

Frequency distributions of total scores in Hindi Achievement test of different grouping of Grade I.

Total Score in Hindi Achievement Test Class Intervals	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN + RURAL Male	URBAN + RURAL Female	URBAN + RURAL Total
81.43-95.00	9	8	17	2	2	4	11	10	21
67.86-	4	2	6	6	7	13	10	9	19
34.29-	4	7	11	4	2	6	8	9	17
40.71-	5	5	10	9	0	9	14	5	19
27.14-	2	3	5	5	3	8	7	6	13
13.57-	13	7	20	11	2	13	24	9	33
0.00-	29	10	39	24	19	43	53	29	82
Total	66	42	108	61	35	96	127	77	204
Mean	29.94	43.64	35.27	28.38	29.77	28.89	29.15	37.34	32.2[illegible]
S.D.	32.19	31.98	32.65	27.30	33.63	29.59	29.94	32.75	31.[illegible]

Table 13-5

Distribution of mean values of scores in the three sub-tests and their total, of the achievement test in Hindi for different groupings in Grade I.

Sub-test and sex		URBAN N	URBAN Mean	RURAL N	RURAL Mean	URBAN + RURAL N	URBAN + RURAL Mean
Sub-Test I	Male	66	12.85	61	14.25	127	13.52
	Female	42	16.64	35	13.06	77	15.01
	Total	108	14.32	96	13.81	204	14.10
Sub-Test II	Male	66	5.47	61	5.11	127	5.30
	Female	42	8.02	35	5.57	77	6.91
	Total	108	6.46	96	5.28	204	5.91
Sub-Test III	Male	66	11.62	61	9.02	127	10.37
	Female	42	18.98	35	11.43	77	15.54
	Total	108	14.48	96	9.90	204	12.24
Total Test	Male	66	29.94	61	28.38	127	29.15
	Female	42	43.64	35	29.77	77	37.34
	Total	108	35.27	96	28.89	204	32.26

superiority of the urban males over the rural males is only slight, the same of urban females over the rural females is far more pronounced. In fact, in sub-test I, the average for rural boys is greater than that for urban boys.

Next, we can move on to a consideration of the performance of the subjects of Grade II in the Hindi achievement tests.

Performance of Children of Grade II in Hindi Achievement Test

As in Grade I, the Hindi Achievement Test, for Grade II, has also threo parts, sub-Test I, sub-Test II and sub-Test III. By summing the scores obtained by any S in all the three sub-tests, a total score is also obtained.

Frequency distributions of scores in sub-Test I, made by different groupings of subjects of Grade II, are shown in Table 13-6.

Table 13-6.

Frequency distributions of scores in sub-Test I in Hindi obtained by different groupings of Grade II.

Score in Hindi sub-Test Class Intervals.	URBAN			RURAL			URBAN + RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
31.71-37.00	0	0	0	0	0	0	0	0	0
26.43-	0	0	0	0	0	0	0	0	0
21.14-	0	0	0	0	0	0	0	0	0
15.86-	5	4	9	4	1	5	9	5	14
10.57-	15	19	34	17	9	26	32	28	60
5.29-	18	8	26	29	7	36	47	15	62
0.00-	19	8	27	16	9	25	35	17	52
Total	57	39	96	66	26	92	123	65	188
Mean	8.07	10.23	8.23	7.95	8.54	8.12	8.01	9.55	8.54
S.D.	5.31	5.32	5.40	4.46	5.22	4.67	4.87	5.24	5.06

In Table 13-6 it will be seen that the girls have averaged higher scores both from urban and rural schools. But the urban-rural differences are slight.

The frequency distributions for scores in sub-Test II made by different groupings of grade are next shown in Table 13-7.

The most noteworthy feature of the distributions shown in Table 13-7 is the marked superiority of the urban girls over all other groups. The difference between the urban boys and rural boys is slight. Most of the distributions are either rectangular or multi-modal showing pronounced heterogeneity of the samplos.

Lastly, the frequency distributions of socres

made by subjects belonging to Grade II in sub-Test III of the Hindi Achievement Test are shown in Table 13-8.

Table 13-7.

Frequency distribution of scores in Sub-Test II in Hindi obtained by different groupings of Grade II

Score in Hindi sub-Test II Class Intervals	URBAN			RURAL			URBAN + RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
41.14-48.00	9	14	23	4	1	5	13	15	28
34.26-	5	8	13	7	1	8	12	9	21
27.43-	9	3	12	9	3	12	18	6	24
20.57-	3	4	7	13	8	21	16	12	28
13.71-	5	0	5	8	1	9	13	1	14
6.86-	8	2	10	9	4	13	17	6	23
0.00-	18	8	26	16	8	24	34	16	50
Total	57	39	96	66	26	92	123	65	188
Mean	20.14	30.26	24.25	19.45	17.50	18.90	19.77	25.15	21.60
S.D.	16.93	17.44	17.77	14.05	13.77	13.92	15.47	15.78	16.03

Table 13-8.

Frequency distribution of scores obtained in Sub-Test III of the Hindi Achievement Test by different groupings of Grade II

Score in Hindi Sub-Test III Class Intervals	URBAN			RURAL			URBAN + RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
41.14-48.00	0	0	0	0	0	0	0	0	0
34.29-	0	0	0	0	0	0	0	0	0
27.43-	0	0	0	0	0	0	0	0	0
20.57-	0	0	0	0	0	0	0	0	0
13.71-	2	5	7	1	0	1	3	5	8
6.86-	25	14	39	27	14	41	52	28	80
0.00-	30	20	50	38	12	50	68	32	100
Total	57	39	96	66	26	92	123	65	188
Mean	5.93	7.33	6.50	5.89	6.50	6.07	5.91	7.00	6.29
S.D.	4.38	4.70	4.54	3.51	2.66	3.29	3.94	4.01	3.94

It will be seen that the trends in the magnitude of group averages in sub-Test III are along the same lines as in those for sub-Test II, only the magnitude of the differences between the averages is somewhat reduced.

The distribution of group means for total scores in three sub-Tests for grade subjects are shown in Table 13-9.

Table 13-9.

Frequency distributions of total scores obtained in all three sub-tests of the Hindi achievement test, by different groupings of Grade II

Total scores in Hindi Achievement Test Class Intervals	URBAN			RURAL			URBAN + RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
81.43-95.00	0	1	1	0	0	0	0	1	1
7.86-	4	8	12	2	1	3	6	9	15
54.29-	9	9	18	6	1	7	15	10	25
40.71-	11	9	20	18	8	26	29	17	46
27.14-	7	2	9	14	5	19	21	7	28
13.57-	12	3	15	14	7	21	26	10	30
0.00-	14	7	21	12	4	16	26	11	37
Total	57	39	96	66	26	92	123	65	188
Mean	34.14	47.79	39.69	32.71	32.54	32.66	33.37	41.69	36.25
S.D.	21.11	24.49	25.06	19.06	18.14	18.71	20.03	22.18	22.18

So far as the averages for the total scores in the entire test are concerned, we note the repetition of the same trends as for the sub-test averages: the rural sample as a whole is worse of than the urban sample - but this primarily is due to the pronounced superiority of performance by the girls of the urban schools. The differences between the averages for the urban boys, rural boys and rural girls are very small.

All the different sub-group averages, in the sub-tests and the total test for achievement in Hindi have been brought together in Table 13-10, which might help in examining the trends more easily.

Several points are quite clear from the averages of scores in the Hindi Achievement shown in Table 13-10. The urban subjects as a group have always an edge over the rural subjects. But the difference between urban sub-samples and their rural counterparts is x usually small, save one

exception: the girls group from the urban samplo has scored consistently better than any other comparable group, in all the three sub-tests. Even tho rural female as a group seems to have had an edge ovor thoir male counterparts, in the rural area, as well as in the urban area, in two sub-tests out of three. These characteristics might be indicative of a consistent psycho-cultural effect, or it may be a random phenomenon. What actually tho situation is liko can be gone into, when we have considered the distribution of test-scores in the Hindi achievement test by Ss of Grade V. To them we turn for consideration in the following section.

Tablo 13-10.

Distribution of mean scoros in tho threo sub-tests and the total test for achievemont in Hindi, for various groupings of Grado II

Sub-test and Sex	URBAN N	URBAN Mean	RURAL N	RURAL Mean	URBAN + RURAL N	URBAN + RURAL Mean
Sub-Test I Male	57	8.07	66	7.95	123	8.01
Female	39	10.23	26	8.54	65	9.55
Total	96	8.95	92	8.12	188	8.54
Sub-Test II Male	57	20.14	66	19.45	123	19.77
Female	39	30.26	26	17.50	65	25.15
Total	96	24.25	92	18.90	188	21.60
Sub-Test III Male	57	5.93	66	5.89	123	5.91
Female	39	7.33	26	6.50	65	7.00
Total	96	6.50	92	6.07		
Whole Test Male	57	34.14	66	32.71	123	33.37
Female	39	47.79	26	32.54	65	41.69
Total	96	39.69	92	32.66	188	36.25

3. Achievement in Hindi by subjects of Grade V

First, the frequency distributions of scores obtained by different groupings in Grade V in Sub-Test I of the Hindi Achievement test are shown in Table 13-11.

Two points are worthy of note in Table 14-11: in sub-test I, the girls, both of urban schools and rural school have lower averages than the boys. The rural sample as a who

has a lower average than the urban sample.

The same trend is exhibited by the group averages for sub-test II, shown in Table 13-12.

Table 13-11.

Frequency distributions of scores obtained in sub-Test I of the Hindi achievement test by different groupings of Grade V.

Scores in Hindi Sub-Test I Class Intervals	URBAN			RURAL			URBAN + RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
31.71-37.00	5	0	5	2	0	2	7	0	7
26.43-	9	2	11	4	1	5	13	3	16
21.14-	9	2	11	17	1	18	26	3	29
15.86-	18	10	28	26	6	32	44	16	60
10.57-	11	10	21	14	10	24	25	20	45
5.29-	9	6	15	16	11	27	25	17	42
0.00-	4	2	6	4	2	6	8	4	12
Total	65	32	97	83	31	114	148	63	211
Mean	18.51	14.97	17.34	16.77	12.42	15.59	17.53	13.71	16.39
S.D.	8.49	6.45	8.02	7.51	5.76	7.36	7.99	6.09	7.68

Table 13-12.

Frequency distributions of scores obtained in Sub-Test II of Hindi achievement test by different groupings of Grade V.

Scores in Hindi Sub-Test II Class Intervals.	URBAN			RURAL			URBAN + RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
41.14-48.00	0	0	0	0	0	0	0	0	0
34.26-	0	0	0	0	0	0	0	0	0
27.43-	0	0	0	0	0	0	0	0	0
20.57-	6	0	6	3	0	3	9	0	9
13.71-	16	10	26	20	2	22	36	12	48
6.86-	24	12	36	37	12	49	61	24	85
0.00-	19	10	29	23	17	40	42	27	69
Total	65	32	97	83	31	114	148	63	211
Mean	10.97	9.66	10.54	9.93	6.87	9.10	10.38	8.29	9.76
S.D.	6.49	4.54	5.93	5.61	3.96	5.37	6.01	4.27	5.17

Next, we may consider the performance by the subjects in sub-test III of the Hindi achievement test. The frequency distributions of this sub-test are shown in Table 13-13.

Table 13-13.

Frequency distributions of scores in sub-Test III of the Hindi achievement test obtained by different groupings of Grade V.

Scores in Hindi Sub-Test III Class Intervals	URBAN Male	Female	Total	RURAL Male	Female	Total	URBAN + RURAL Male	Female	Total
41.14-48.00	0	0	0	0	0	0	0	0	0
34.26-	0	0	0	0	0	0	0	0	0
27.43-	2	0	2	1	0	1	3	0	3
20.57-	13	3	16	4	3	7	17	6	23
13.71-	13	11	24	16	3	19	29	14	43
6.86-	23	11	34	51	18	69	74	29	103
0.00-	14	7	21	11	7	18	25	14	39
Total	65	32	97	83	31	114	148	63	211
Mean	13.25	12.75	13.08	11.34	10.00	10.97	12.12	11.40	11.94
S.D.	7.69	5.67	7.06	5.19	5.48	5.28	6.25	5.58	6.16

There is again nothing new in Table 13-13: the averages for sub-Test III, for the different groups show the same trend as in the case of sub-test II: boys are somewhat better than the girls; and urban boys and girls are better than rural boys and girls.

Lastly, the frequency distributions of the scores obtained by the different groups of children of grade V in the whole test of achievement in Hindi have been shown in Table 13-14.

The total scores in Hindi achievement only accentuate the differences between the average performance of the groups. The difference between the lowest average 29.29 for rural girls is fully 13.43 points below the highest average of 42.72 scored by the urban boys. In the whole test, rural boys are slightly better than the urban girls.

In order to have general perspective of the magnitude of the different average value of scores in the sub-tests, and the entire test, for different types of groups within grade V, these have been brought together and shown in Table 13-15.

Table 13-14.

Frequency distributions of total scores of the Hindi achievement test obtained by different groupings of grade V.

Scores in Sub-Test III Class Intervals	URBAN			RURAL			URBAN + RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total.
81.43-95.00	1	0	1	1	0	1	2	0	2
67.86-	10	1	11	2	0	2	12	1	13
54.29-	8	1	9	8	1	9	16	2	18
40.71-	11	11	22	24	6	30	35	17	52
27.14-	15	10	25	25	8	33	40	18	58
13.57-	18	9	27	20	15	35	38	24	62
0.00-	2	0	2	3	1	4	5	1	6
Total	65	32	97	83	31	114	148	63	211
Mean	42.72	37.38	40.96	37.92	29.29	35.57	40.43	33.40	38.05
S.D.	20.93	13.19	18.83	16.19	12.39	15.68	16.48	12.79	17.19

Table 13-15.

Mean values of scores in different sub-tests and the whole test, of the achievement test in Hindi, for different groups of subjects in Grade V.

Subtest and Sex		URBAN		RURAL		URBAN + RURAL	
		N	Mean	N	Mean	N	Mean.
Sub-Test I	Male	65	18.51	83	16.77	148	17.53
	Female	32	14.97	31	12.42	63	13.71
	Total	97	17.34	114	15.59	211	16.39
Sub-Test II	Male	65	10.97	83	9.93	148	10.38
	Female	32	9.66	31	6.87	63	8.29
	Total	97	10.54	114	9.10	211	9.76
Sub-Test III	Male	65	13.25	83	11.34	148	12.12
	Female	32	12.75	31	10.00	63	11.40
	Total	97	13.08	114	10.97	211	11.94
Whole Test	Male	65	42.72	83	37.92	148	40.43
	Female	32	37.38	31	29.29	63	33.40
	Total	97	40.96	114	35.57	211	38.05

The trends are quite clear, and can be recapitulated here: (1) Boys, both in rural and urban schools, have higher averages than the girls, in all the three sub-tests, and the total.

(2) Urban boys and urban girls have higher averages than rural boys and rural girls, in all the three subtests, and in the total test.

(3) Urban sample as a whole has a higher average than the rural sample.

In this grade, the trends are very consistent - it holds for sex grouping, for urban and local location of schools, and for different parts of the test as well.

At no other grade, has the test results been so consistently systematic, as in Grade V. It seems, by the time the boys and girls attain this stage of development differentiation becomes fully measurable - which remains at lower than a sort of threshold differentiability at earlier stage of development. This is a finding of some importance.

In the next section we take up the consideration of the performance of the sample of subjects in the other test of school achievements viz., Mathematics achievement.

(2) Achievement in Mathematics

The achievement tests in mathematics were different for the different grades I, II and V. So, there is no question of comparability of scores as such, from one grade to another. Only comparability of different groups within the same grade, in terms of sex, and location of school, is meaningful.

The frequency distribution of scores in the mathematics achievement test obtained by subjects of grade I are shown in Table 13-16.

Several interesting points are worth noting from Table 13-16. First, the girls of the urban schools have done much better than the boys of the urban schools; but boys in the rural schools have done better than girls of the rural school. Again, both boys and girls of the urban schools have done better than their counterparts in the rural schools. Lastly, the urban sample as a whole has done better than the rural sample as a whole.

Table 13-16.

Frequency distributions of scores in Mathematics achievement Test by different groupings of subjects of Grade I

Scores in Maths. Test Class Intervals	URBAN			RURAL			URBAN + RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
34.26-40.00	10	5	15	4	3	7	14	8	22
28.57-	10	5	15	3	2	5	13	7	20
22.86-	4	8	12	6	3	9	10	11	21
17.14-	2	6	8	10	1	11	12	7	19
11.43-	5	4	9	7	4	11	12	8	20
5.71-	24	9	33	17	10	27	41	19	60
0.00-	11	5	16	14	12	26	25	17	42
Total	66	42	108	61	35	96	127	77	204
Mean	16.70	19.40	17.75	14.03	12.66	13.57	15.42	16.34	15.76
S.D.	12.97	11.34	12.38	10.35	11.81	10.87	11.78	11.56	11.69

The frequency distributions of scores in the mathematics achievement test obtained by the pupils of grade II are shown in Table 13-17.

It is ~~rather~~ interesting to note that the situation is only somewhat reversed, in Grade II. Here, the girls of the urban schools have done better than the boys of the urban schools, just as we found in Grade I. But in the rural schools, the situation is reversed: here the girls have done better than the boys, whereas in Grade I, the boys have done better than the girls. The urban sample is only slightly superior than the rural sample, if sex of the subjects is ignored.

The frequency distribution of mathematics achievement test scores obtained by subjects of Grade V are shown in Table 13-18.

The situation Grade V is now again quite different from that in Grades I and II. Now, we find that, the boys of urban schools have done better than girls of urban school - which is a reversal of the trends of Grades I and II. However, in the rural schools, boys have done, but opposite

Table 13-17.

Frequency distributions of scores obtained in the Achievement test in Mathematics by different groupings of subjects of Grade II.

Score in Maths. Test Class Intervals	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN + RURAL Male	URBAN + RURAL Female	URBAN + RURAL Total
14.26-40.00	0	0	0	0	0	0	0	0	0
28.57-	0	0	0	0	0	0	0	0	0
22.86-	0	1	1	1	1	2	1	2	3
17.14-	5	5	10	4	0	4	9	5	14
11.43-	17	14	31	16	10	26	33	24	57
5.71-	19	12	31	30	10	40	49	22	71
0.00-	16	7	23	15	5	20	31	12	43
Total	57	39	96	66	26	92	123	65	188
Mean	9.49	11.28	10.22	9.42	10.15	9.63	9.45	10.83	9.93
S.D.	5.47	5.92	5.70	5.15	5.04	5.10	5.30	5.59	5.42

Table 13 - 18.

Frequency distributions of scores obtained in the Mathematics Achievement Test by different groupings of subjects of Grade V.

Scores in Maths.Test. Class Intervals	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN + RURAL Male	URBAN + RURAL Female	URBAN + RURAL Total
34.26-40.00	0	0	0	0	0	0	0	0	0
28.57-	0	0	0	0	0	0	0	0	0
22.86-	2	0	2	2	0	2	4	0	4
17.14-	4	3	7	8	0	8	12	3	15
11.43-	15	6	21	13	3	16	28	9	37
5.71-	34	13	47	35	15	50	69	28	97
0.00-	10	10	20	25	13	38	35	23	58
Total	65	32	97	83	31	114	148	63	211
Mean	9.85	8.78	9.49	9.07	6.74	8.44	9.41	7.78	8.92
S.D.	5.22	5.01	5.15	5.67	3.80	5.32	5.48	3.46	5.26

to what boys of Grade II have done. The overall superiori of the urban sample over the rural samples is maintained.

Before we end this section, one comment may be offered on the extremely skewed nature of the distributio of the scores, in all the three grades. If we refer to Table 13-16, we note that the groups are heterogenous in

terms of performance in the mathematics achievement test. - the distributions are usually multi-modal, with a good deal of crowding towards the lower end of the scales. In Grade II, the distributions assume greater normality, and this trend is continued in Grade V. But the distributions, in these two grades, by and large, remain positiv ly skewed, showing the rarity of boys and girls in both rural and urban schools who have done well in the mathematics test.

In order to have an overview of the performance of children of different grades, in different locations, and belonging to the two sexes, in the mathematics achievement test, Table 13-19 has been prepared.

From this table, it will be possible to trace the rather unsystematic changes in the magnitudes of the average values of the mathematics achievement test, as one goes from one small group to another, within the same grade.

Table 13-19.

Mean values of achievement test in mathematics of different groups of subjects of Grade V.

Grade and Sex		URBAN		RURAL		URBAN + RURAL	
		N	Mean	N	Mean	N	Mean
Grade I	Male	66	16.70	61	14.03	127	15.42
	Female	42	19.40	35	12.66	77	16.34
	Total	108	17.75	96	13.53	204	15.76
Grade II	Male	57	9.49	66	9.42	123	9.45
	Female	39	11.28	26	10.15	65	10.83
	Total	96	10.22	92	9.63	188	9.23
Grade V	Male	65	9.85	83	9.07	148	9.41
	Female	32	8.75	31	6.74	63	7.78
	Total	97	9.49	114	8.44	211	8.92

CHAPTER 14

Performance in Mosaic Test

All the subjects had been administered the Indian Adaptation of the Lowenfeld Mosaic Test, from which exact replicas were obtained for each test protocol. Certain observations about the behaviour of the child while engaged in the mosaic test were made. However, because of the novelty of the tast before the child, there was such a routine variability in their first approach to the task at hand, it was found that no useful purpose would be served by subjecting such observations to any analysis. Whatever variability was observed were individual characteristics, and there was little sense in trying to find any meaningful relation between such behaviours and systematic variation in background and school variables. So these overt observable test-taking behaviours, which had been recorded for each subject as a matter of routine, have been excluded from the purview of the analysis of data presented here.

If the performance of the child in the mosaic test is brought to the focus of attention, then we note that we have here a permanent and fairly accurate replica of the actual performance of the subject in the form of a design that he has created by his own effort. This mosaic design, for purposes of scientific analysis, can be examined in terms of two classes of characteristics. One in the objective features of the mosaic design. The other class refers to the 'subjective ' or 'qualitative' features of the mosaic design. How the mosaic design varied, from one group to another, in terms of grade, sex and location of schools, and with regard to the different objective features, and the subjective features, will be now described below.

A. Objective features of Mosaic Designs

1. Time taken to complete the mosaic design:

Accurate record of the duration of time taken by an S to complete his mosaic design was kept. 'Time taken' for this purpose meant 'the duration from the moment the child lifted the first plastic piece from the case, to the point when he stopped taking any further piece from the case, by withdrawing his hand'. The duration of time was then rounded to the nearest minute.

The frequency distributions of 'time taken' to complete the mosaic design, by different groups of subjects in group I are shown in Table 14-1.

Several points are worth noting from the distributions shown in Table 14-1. First, the urban groups have spent on the average more time for completing the design, compared to the rural groups. Secondly, the boys in both urban and rural schools have taken more time on the average than the girls in urban and rural schools. The distributions are also highly unsymmetrical - with a positive skew.

Frequency distributions of 'time taken' to complete the mosaic design by different group of subjects of grade II are shown in Table 14-2.

It is worth noting that the trends shown for distributions for grade I, are also present for the same in grade II: urban groups have higher averages than the rural groups, and male groups have higher averages than female groups. The skewness of the distributions is no less pronounced.

Frequency distributions of 'time taken' to complete the mosaic designs by different groups of subjects of grade V are shown in Table 14-3.

There was one peculiarity of the distributions of 'time taken' for male subjects of the rural schools which should be kept in mind: There are <u>two</u> cases- just 2 cases, - who had taken abnormally long time- more than 24 minutes- to complete their mosaic. As a result, the average 'time taken' for this group has become very high. But the overall trend is the same as in grades I and II - male groups have higher averages than females, and urban samples have higher averages than rural samples. The distributions have also become some what more symmetrical.

To have a general overview of the magnitude of the mean values of 'time taken', as one goes from one group to another, these have been brought together and shown in Table 14-4.

The systematic increase in the 'average time' taken to complete the mosaic, as one goes from grade I through grade II to grade V will become very clear. And this holds for the two sex groups separately also. Again, if the averages for the three grades are pooled together, we find that the urban samples have a higher average than the rural samples-a trend which is constant over the sex groupings of the samples.

This finding has some interesting significance for developmental psychology. The lowest mean for any group is 2.84 minutes, spent on designing the mosaic; this is the average for female children of grade I in rural areas. The highest average is 7.60 minutes- for male children of grade V. The systematic increase in the time spent on constructing the mosaic design as a function of the overall maturation and development of the child seems to be a stable phenomenon.

2. "Total number of pieces used" in constructing the Mosaic Design :

The next objective variable is 'total number of pieces used' for constructing the mosaic design. How many pieces are used for making a design is largely a matter of choice of the individual subject. Its psychological importance lies in the fact that all subjects have an equal number that is no less than 360 pieces of plastics, varying in color, and in shape, out of which he can choose anything from 1 to any number he desires, and that he thinks is needed for the design he has in mind. Thus the total number of pieces is related to the psychology of the individual's choice process.

The frequency distributions of total number of pieces used for constructing the mosaic designs, for different groups of subjects of grade I are shown in Table 14-5.

The unsymmetrical nature of the distributions should be noted first. Then it will be seen that the mean values for the four different small groups do not follow any particular trend. The highest average value of total number of pieces used is for urban boys, next comes rural girls, followed by rural boys, and last come urban girls. Both the rural samples have higher averages than the urban girls.

The frequency distributions of 'total number of pieces' used for different groups in grade II are shown in Table 14-6.

The situation with regard to the averages, in grade II is equally unsystematic. Here, the urban boys have the highest average; next come rural girls; then follow urban girls; and lastly come rural boys with a very low average. One stray case in the urban boys group has used a very large number of pieces, with the result that the group average has been pulled upwards. The crowding of most cases towards the lower ends continues.

The frequency distributions of the 'total number of pieces' used by the different groups of Grade V are shown in Table 14-7.

In Grade V, as expected the group average for urban boys is highest, next come urban girls; then follow rural girls, and lastly come rural boys. It will thus be seen, that within the same grade, there does not appear to be any systematic trend in the magnitude of average values, from one sex group to another, within or across locations.

Table 14 - 1

Frequency distributions of 'time taken' to complete the mosaic design by different groups of subjects of grade I.

Time Taken in minutes Class Interval	URBAN			RURAL			URBAN & RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
24.14-28.00	0	0	0	0	0	0	0	0	0
20.29-	0	0	0	0	0	0	0	0	0
16.43-	0	0	0	0	0	0	0	0	0
12.57-	1	0	1	0	0	0	1	0	1
8.71-	4	4	8	1	1	2	5	5	10
4.86-	22	11	33	5	1	6	27	12	39
1.00-	39	27	66	55	33	88	94	60	154
Total	66	42	1.08	61	35	96	127	77	204
Mean	4.47	4.19	4.36	2.84	2.42	2.69	3.68	3.39	3.57
SD	2.76	2.84	2.75	1.44	1.60	1.50	2.23	2.36	5.06

Table 14 - 2

Frequency distributions of 'time taken' to complete mosaic design by different groups of subjects of Grade II.

Time Taken in minutes Class Interval.	URBAN			RURAL			URBAN & RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
24.14-28.00	0	0	0	0	0	0	0	0	0
20.29	0	0	0	0	0	0	0	0	0
16.43	1	0	1	0	0	0	1	0	1
15.57	1	0	1	0	0	0	1	0	1
8.71	5	3	8	2	0	2	7	3	10
4.86	19	15	34	18	8	26	37	23	60
1.00	31	21	52	46	18	64	77	39	116
Total	57	39	96	66	26	92	123	65	188
Mean	5.05	4.41	4.79	3.59	3.38	3.53	4.27	4.00	4.17
SD.	3.53	2.65	3.20	1.95	1.50	1.83	2.79	2.26	2.62

Tablo 14 - 3

Frequency distributions of 'timo taken' to complete mosaic designs by different groups of subjects of Grado V.

Time Taken in Minute Class Interval.	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN & RURAL Male	URBAN & RURAL Female	URBAN & RURAL Total
24.14-29.00	2	0	2	0	0	0	2	0	2
20.29-	0	0	0	0	0	0	0	0	0
16.43	0	0	0	0	0	0	0	0	0
15.57	16	2	8	1	0	1	7	2	9
8.71	16	3	19	5	5	10	21	8	29
4.86	22	12	34	41	9	50	63	21	84
1.00	19	15	34	36	17	53	55	32	87
Total	65	32	97	83	31	114	148	63	211
Mean	7.60	5.25	6.82	4.99	4.94	4.97	5.23	5.09	5.82
SD	5.57	3.93	5.19	2.56	3.07	2.70	4.16	3.53	4.04

Table 14-4

Distribution of mean values of 'time taken' to complete the mosaic design for different groups of subjects of all the three grades.

Grade and Sex		URBAN N	URBAN Mean	RURAL N	RURAL Mean	URBAN & RURAL N	URBAN & RURAL Mean
Grade I	Male	66	4.47	61	2.84	127	3.68
	Female	42	4.19	35	2.43	77	3.39
	Total	108	4.36	96	2.69	204	3.54
Grade II	Male	57	5.05	66	3.59	127	4.27
	Female	39	4.41	20	3.38	65	4.00
	Total	96	4.79	86	3.53	192	4.17
Grade V	Male	65	7.60	83	4.99	148	6.23
	Female	32	5.25	31	4.94	63	5.09
	Total	97	6.82	114	4.97	211	5.82
All Grades	Male	188	5.73	210	3.92	398	4.78
	Female	113	4.57	92	3.54	210	4.11
	Total	301	5.29	302	3.83	603	4.55

In order to see how the average values have varied from grade to grade, all the means have been bought together in Table 14-8.

Let us look at the average values of the 'total number of pieces used' from grade I through grade II to grade V. We will see, that the average value goes on increasing systematically for the urban males, as well as for urban females. This is not exactly true for the male groups of the rural schools and also for the female groups of the rural schools. For the rural males, the average for grade V is highest followed by the average for Grade I, the lowest being for Grade I. For the rural girls, however, the highest is for Grade II, next is for Grade V, the lowest being for Grade I.

If the averages are pooled for both the sexes, then there is a systomatic increase in the averages starting with the lowest in Grade I and going to the highest in Grade V- this holds for both urban and rural samples separately, as well as when both urban and rural samples are pooled together. The slightly higher average values for the urban groups is a stable relationship which holds for all the three grades.

The general trend then appears to be an increase in the total number of pieces as the child becomes older. Again, while in the urban schools, the boys tend to use a larger number of pieces to build the mosaic, in the rural schools the opposite appears to be true: here the girls have tended to have used a higher number of pieces on the average than the boys of the same grades. This reversal of trend or what is called sex and location interaction appears to be a very interesting piece of finding- all the more interesting because no such sex X location interaction has been found for 'time taken' for completing the mosaic. This means, the girls in the rural schools, have tended to use the pieces faster than their male counter-parts. Further implications of this finding can be gone into later.

Table 14 - 5

Frequency distribution of 'total number of pieces' used to complete the mosaic design, by different groups of subjects of Grade I.

Total No. of pieces used Class Intervals	Urban			Rural			Urban & Rural		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
50-58	0	0	0	0	0	0	0	0	0
42-	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0
26	1	1	2	0	0	0	1	1	2
18	6	3	9	1	2	3	7	5	12
10	12	2	14	11	11	22	23	13	36
2-	47	36	83	49	22	71	96	58	154
Total	66	42	108	61	35	96	127	77	204
Mean	9.45	7.81	8.81	8.02	8.60	8.23	8.76	8.17	8.54
SD	5.61	5.91	5.73	3.96	4.79	4.27	4.89	5.55	4.61

Table 14 - 6

Frequency distributions of 'total number of pieces' used to complete the mosaic design, by different groups of subjects of Grade II.

Total No. of pieces Used class intervals	URBAN			RURAL			URBAN & RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
50-58	1	0	1	0	0	0	1	0	1
42-	0	0	0	0	0	0	0	0	0
34-	0	2	2	0	2	2	0	4	4
26-	2	0	2	0	0	0	2	0	2
18-	6	1	7	1	1	2	7	2	9
10-	11	13	24	11	4	15	22	17	39
2-	37	23	60	54	19	73	91	42	133
Total	57	39	96	66	26	92	123	65	188
Mean	11.18	10.15	10.76	7.80	10.96	8.70	9.36	10.47	9.7
SD	8.88	7.66	3.38	3.84	9.67	6.16	6.69	8.52	7.3

Table 14 - 7

Frequency distributions of 'total number of pieces used' to complete the mosaic design, by different groups of subjects of Grade V.

Total No. of pieces used class intervals	URBAN			RURAL			URBAN & RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
50-58	0	0	0	0	0	0	0	0	0
42-	0	0	0	0	0	0	0	0	0
34-	1	0	1	0	0	0	1	0	1
26-	1	3	4	2	1	3	3	4	7
18-	8	4	12	6	3	9	14	7	21
10-	26	4	30	22	8	30	48	12	60
2-	29	21	50	53	19	72	82	40	122
Total	65	32	97	83	31	114	148	63	211
Mean	12.54	10.97	12.02	10.07	10.94	10.31	11.15	10.5	11.09
SD	6.70	8.56	7.36	6.10	6.87	6.30	6.37	7.78	6.80

Table 14 - 8

Distribution of Mean values of 'number of pieces' used to complete the mosaic design for different groups of subjects of all the three grades.

Grade & Sex	URBAN N	URBAN Mean	RURAL N	RURAL Mean	URBAN & RURAL N	URBAN & RURAL Mean
Grade I Male	66	9.45	61	8.02	127	8.76
Female	42	7.81	35	8.60	77	8.17
Total	108	8.81	96	8.23	204	8.54
Grade II Male	57	11.18	66	7.80	123	9.36
Female	39	10.15	26	10.96	65	10.47
Total	96	10.76	92	8.70	188	9.75
Grade V Male	65	12.54	83	10.07	148	11.15
Female	32	10.97	31	10.94	63	10.95
Total	97	12.02	114	10.31	211	11.09
M Grade Male	188	11.04	210	9.11	398	10.34
Female	113	9.51	92	10.05	205	9.75
Total	301	10.46	302	9.81	603	10.14

3. Number of subdesigns used in the Mosaic Designs.

A feature of the design which is easily quantified, is whether the design is a single unified whole, or it is made up of a number of sub-designs. The frequency distributions of the number of sub-designs used by different groups of subjects of grade I, II and V, are shown in Table 14-9, 14-10 and 14-11.

There is nothing interesting in these distributions, showing the number of sub-designs used by different sub-groups in the three grades. A overwhelmingly large number of subjects in each grade, and among both boys and girls, have tended to make use of only one single design; only a few more have used 2 sub-designs; the number of subjects who have used more than 2 sub-designs, is only 21, out of a total of 603 subjects, which is about 3.5 %.

The mean values of the number of sub-designs used by different groups in all the three grades. have been shown together in Table 14-12.

One interesting point worth noting is that, as we go from grade I to grade II, the average number of sub-designs for male and female groups, does not register any systematic increase in the urban schools. There is no systematic sex difference also. The same is true for the grade averages for the rural schools. However , it appears that the average for the urban subjects, pooled over both boys and girls, have a slightly lower value than that for the rural sample, also pooled over the two sexes.

4. Extent of Area covered by the Mosaic Design.

Another quantifiable feature of the mosaic design is the extent of area covered by the design. The fact remains that some tend to cover a lot of space, others tries to heap the pieces as closely as possible. Some have no concern with whether or not any area is covered, at all.

The distributions of the mean area covered by the designs constructed by the different groups of subjects

Table 14 - 9

Frequency distributions of 'number of sub-designs' used in completing the mosaic design by different groups of subjects of Grade I

No. of Sub-designs Class Interval	URBAN			RURAL			URBAN & RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
13-15	0	0	0	0	0	0	0	0	0
11-	0	0	0	0	0	0	0	0	0
9-	0	0	0	0	0	0	0	0	0
7-	0	0	0	0	0	0	0	0	0
5-	0	0	0	0	2	2	0	2	2
3-	0	0	0	4	0	4	4	0	4
1-	66	42	108	57	33	90	123	75	198
Total	66	42	108	61	35	96	127	77	204
Mean	1.18	1.02	1.12	1.34	1.37	1.35	1.26	1.18	1.2
SD	.49	.15	.40	.89	1.33	1.06	0.71	0.92	0.7

Table 14 - 10

Frequency distributions of 'number of sub-designs' used for completing the mosaic design by different groups of subjects of Grade II.

Class Interval	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN & RURAL Male	URBAN & RURAL Female	URBAN & RURAL Total
13-15	0	0	0	0	0	0	0	0	0
11-	0	0	0	0	0	0	0	0	0
9-	0	0	0	0	0	0	0	0	0
7-	0	0	0	1	0	1	1	0	1
5-	0	0	0	1	0	1	1	0	1
3-	1	2	3	3	1	4	4	3	7
1-	56	37	93	61	25	85	117	62	179
Total	57	39	96	66	26	92	123	65	188
Mean	1.23	1.18	1.21	1.50	1.27	1.43	1.37	1.21	1.32
SD	0.60	0.68	0.63	1.42	0.87	1.29	1.11	0.59	1.01

Table 14 - 11

Frequency distributions of 'number of sub-designs' used for completing the mosaic design by different groups of subjects of Grade V.

No. of Sub-Design Class Interval.	URBAN			RURAL			URBAN & RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
13-15	0	0	0	1	0	1	1	0	1
11-	0	0	0	0	0	0	0	0	0
9-	0	0	0	0	0	0	0	0	0
7-	0	0	0	0	0	0	0	0	0
5-	0	0	0	1	1	2	1	1	2
3-	0	1	1	3	1	4	3	2	5
1-	65	31	96	78	29	107	143	60	203
Total	65	32	97	83	31	114	148	63	211
Mean	1.15	1.19	1.16	1.42	1.32	1.39	1.30	1.25	1.2[illegible]
SD	0.48	0.74	0.57	1.74	1.05	1.58	1.36	0.91	1.2[illegible]

Table 14 - 12

Distribution of mean 'number of sub-designs' in the mosaic designs completed by different groups of subjects belonging to all the three grades.

Grade and Sex		URBAN		RURAL		URBAN & RURAL	
		N	Mean	N	Mean	N	Mean
Grade I	Male	66	1.18	61	1.34	127	1.26
	Female	42	1.02	35	1.37	77	1.18
	Total	108	1.12	96	1.35	204	1.23
Grade II	Male	57	1.23	66	1.50	123	1.37
	Female	39	1.18	26	1.27	65	1.21
	Total	96	1.21	92	1.43	188	1.32
Grade V	Male	65	1.15	83	1.42	148	1.30
	Female	32	1.19	31	1.32	63	1.25
	Total	97	1.16	114	1.39	211	1.29
All Grades	Male	188	1.18	210	1.45	398	1.12
	Female	113	1.12	92	1.33	205	1.21
	Total	301	1.16	302	1.39	603	1.15

Table 14 - 13

Frequency distributions of 'extent of area' covered by the mosaic designs constructed by the different groups of subjects of Grade I.

Area Covered in Sb.Cm. Class Interval	URBAN			RURAL			URBAN & RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1922-51-2240	0	0	0	0	0	0	0	0	0
1605-14	0	0	0	0	0	0	0	0	0
1287.71	0	0	0	0	0	0	0	0	0
970.28	0	0	0	0	0	0	0	0	0
652-86	0	0	0	1	0	1	1	0	1
335-43	6	3	9	0	1	1	6	4	10
18.00-	60	39	99	60	34	94	120	73	193
Total	66	42	108	61	35	96	127	77	204
Mean	172.32	133.38	157.18	122.38	127.97	124.42	148.33	130.92	141.7[illegible]
SD	116.28	109.34	114.72	108.82	77.63	98.20	112.76	81.39	107.2[illegible]

Table 14 - 14

Frequency distributions of mean 'area covered' by the mosaic designs constructed by the different groups of subjects in Grade II.

Area Covered in Sq.Cm. Class Interval	URBAN			RURAL			URBAN & RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1922	1	0	1	0	0	0	1	0	1
1605	0	0	0	0	0	0	0	0	0
1287	0	0	0	0	0	0	0	0	0
970	0	0	0	0	0	0	0	0	0
653	0	1	1	0	0	0	0	1	1
335	5	2	7	0	2	2	5	4	9
18	51	36	87	66	24	90	117	60	177
Total	57	39	96	66	26	92	123	65	188
Mean	197.08	169.44	185.85	116.62	167.42	128.15	153.91	164.63	157.61
SD	296.19	137.96	243.95	58.58	151.10	95.21	206.15	143.36	186.62

Table 14 - 15

Frequency distributions of mean ' area covered' by the mosaic designs constructed by the different groups of subjects in Grade V.

Area Covered in sq.cm. Class Interval	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN & RURAL Male	URBAN & RURAL Female	URBAN & RURAL Total
1922-2240	0	0	0	0	0	0	0	0	0
1605	0	0	0	0	0	0	0	0	0
1287	0	0	0	0	0	0	0	0	0
970	0	0	0	0	0	0	0	0	0
653	0	0	0	0	0	0	0	0	0
335	3	2	5	5	2	7	8	4	12
18-	62	30	92	78	29	107	140	59	199
Total	65	32	97	83	31	114	148	63	211
Mean	171.02	151.22	164.48	146.06	150.16	147.18	157.01	150.70	155.13
SD	92.35	108.79	97.96	97.45	103.06	98.55	95.24	69.17	98.

of the three grades, grades I, II and V, have been shown in Table 14-13, 14-14, 14-15 respectively.

Just as in the case of the distribution of the number of sub-designs, we find a similar trend with regard to the distributions of "extent of area" covered by the mosaic designs. Majority of the designs covered area which did not exceed 335 sq.cm. This is true for all the three grades, and to all the small homogenous sex groups within each grade. The number of subjects who have constructed mosaic designs exceeding 335 sq. cm. in area, is 10 in Grade I, 10 in Grade II and 12 in Grade V, that is 32 in all the three grades together, which is slightly more than 10% of the total sample.

How the average values of area covered have varied from grade to grade can be seen from Table 14-16, where all the means have been brought together.

First, let us consider the samples of the urban schools. Here we note that, the average for Grade I is lowest, the average for Grade V comes next, and the average for grade II is the highest. In the samples for the rural schools, the trend is more systematic; the mean area covered, starting with the lowest value in grade I, increased only slightly in Grade II, and then increases appreciably in Grade V.

It has already been pointed out, how within each grade, the male subjects have higher average for 'area covered' then the female subjects - so far as urban schools are concerned. Just the reverse trend is seen in all three grades of the rural schools- where the female subjects as a group have higher averages for "area covered" than male subjects. If scores are pooled over both the sexes, the urban samples here higher averages than the male samples, for each of the three grades, and all the three grades pooled together.

Despite the somewhat lack of order among the magnitudes of the average values of 'area covered', some

Table 14 - 16

Distribution of mean values of 'area covered' by the mosaic designs constructed by different groups of subjects of all three grades

Grade & Sex		URBAN		RURAL		URBAN & RURAL	
		N	Mean	N	Mean	N	Mean
Grade I	Male	66	173.32	61	122.38	127	148.33
	Female	42	133.38	35	127.97	77	130.92
	Total	108	157.18	96	124.42	204	141.76
Grade II	Male	57	197.08	66	116.62	123	153.91
	Female	39	169.44	26	157.42	65	164.63
	Total	96	185.85	92	128.15	188	157.61
Grade V	Male	65	171.02	83	146.06	148	157.01
	Female	32	151.22	31	150.16	63	150.70
	Total	97	164.48	114	147.18	211	155.12
All Grades	Male	188	179.64	210	129.93	398	153.28
	Female	113	145.30	92	143.77	205	147.69
	Total	301	168.67	302	134.14	603	151.40

interesting psychological implications of these trends are worth considering. Those can be gone into at a later stage.

B. Subjective or Qualitative features of the Mosaic Designs

The traditions with projective tests have been to concentrate on the presence or absence of qualitative, or at least, on the patterning among the qualitative features of the projective output. Interpretation of projective outputs tended to depend heavily on the judgment of the qualitative variation of the same along hypothesized dimensions. Statistical treatment of such judgment is usually not attempted, or is attempted only cursorily.

In this study also, there is no intention to ignore the qualitative aspects of the mosaic designs, or whatever insight such features can contribute towards unravelling the developmental processes that the children are undergoing due to various forces acting upon them- from their home, schools, and environment. However, since the overall approach of the analysis of data generated in the present study is based upon statistical methods, the qualitative data inhering in the mosaic had also to be brought under the same statistical rubric. This was done, by getting all the mosaics rated by three judges. The mosaic replicas were mixed up throughly, so that there was no possibility of identifying its source- from which grade, or sex, or location or which particular subject it owed its origin could not be known. The rating scale contained three subscales- Sub-Scale I had 6 items, dealing mainly with what may be called the 'pattern quality' of the design. Sub-Scale II had also 6 items, dealing with what may be called the 'aesthehi dimension' of the projective output. Sub-Scale III contained only three items, which were somewhat miscellaneous in nature- in that they showed both pattern and aesthetic attributes. These three sub-scales could be considered as three separate scales, or they could be considered as sections of a large

and comprehensive fifteen-item three -point rating scale. Correlations among the items within each scale were greater than those between items across the scales. Correlations between the three subscales were moderate. This, by itself, was a satisfactory psychometric property.

Pattern quality of Mosaic Designs

The rating given to each protocol for each items by the all the three judges were summed and divided by 3, to obtain an average rating. For the first two sub-scales, the range of possible rating scores was 3 to 18, the range for the third sub-scale was 3 to 9.

The frequency distributions of the ratings in scale I given to the mosaic designs constructed by different groups of subjects of Grade I are shown in table 14-17.

The first point worthy of note in the distributions shown in Table 14-17 is the closeness of the average value of the ratings for the different homogeneous sex groups: difference between urban males and urban females is very slight; difference between rural males and rural females is slightly greater. In both urban and rural schools, boys have higher average ratings than the girls. Again, the urban sample as a whole, has higher average rating than the rural sample as a whole.

The frequency distributions of the ratings of the Scale II given to the mosaic designs constructed by different groups of subjects of Grade II are shown in Table 14-18.

Here, the average values of the ratings, are ordered rather unsystematically. We note that the girls have a higher average than the boys, both in urban as well as rural schools. However, the boys of the urban schools, and the girls of the urban schools, have higher averages than their corresponding counterparts in the rural schools. The overall result is the same as in Grade I: the urban sample as a whole has higher average than the rural sample.

Table 14 - 17

Frequency distributions of mean ratings in scale I given to the mosaic designs constructed by different groups of subjects of Grade I

Mean Ratings Scale I Class Intervals	URBAN Male	URBAN Female	URBAN Total	RURAL Male	RURAL Female	RURAL Total	URBAN & RURAL Male	URBAN & RURAL Female	URBAN & RURAL Total
16.67-18.00	2	0	2	0	0	0	2	0	2
15.34-	1	0	1	2	0	3	3	1	4
14-01-	5	8	13	3	3	6	8	11	19
12.68	16	8	24	13	5	18	29	13	42
11.36	11	6	17	12	6	18	23	12	35
10.03	17	11	28	15	12	27	32	23	55
8.70-	14	9	23	16	8	24	30	17	47
Total	66	42	108	61	35	96	127	77	204
Mean	11.97	11.95	11.96	11.60	11.47	11.55	11.81	11.73	11.7[illegible]
SD	1.99	1.96	1.97	1.71	1.81	1.74	1.86	1.89	1.8[illegible]

Table 14 - 18

Frequency distributions of mean ratings in scale I given to the mosaic designs constructed by different groups of subjects of grade II.

Mean Ratings Scale I Class Intervals	Male	Female	Total	Male	Female	Total	Male	Female	Total
16.67-18.00	2	1	3	1	1	2	3	2	5
15.34	4	3	9	1	0	1	5	5	10
14.01	6	5	11	6	1	7	12	6	18
12.68	8	8	16	15	9	24	23	17	40
11.63	9	4	13	16	5	21	25	9	34
10.03	19	8	27	16	6	22	35	14	49
8.70	9	8	17	11	4	15	20	12	32
Total	57	39	96	66	26	92	123	65	188
Mean	12.17	12.45	12.28	11.99	12.33	12.09	12.07	12.40	1[illegible]
SD	2.17	2.39	2.25	1.83	1.87	1.84	1.99	2.20	2.[illegible]

Table 14 - 19

Frequency distributions of mean ratings in scale I given to the mosaic designs constructed by different groups of subjects of Grade V.

Mean Ratings Scale I Class Interval	URBAN			RURAL			URBAN AND RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
16.67-1800	12	4	16	6	1	7	18	5	23
15.34	5	3	8	10	4	14	15	7	22
14.01	17	10	27	18	11	29	35	21	56
12.68	18	10	28	19	9	28	37	19	56
11.63	7	3	10	13	2	15	20	5	25
10.03	4	1	5	15	3	18	19	4	23
8.70	2	1	3	2	1	3	4	2	6
Total	65	32	97	83	31	114	148	63	211
Mean	14.31	14.11	14.24	13.50	13.92	13.61	13.86	14.05	13.90
SD	2.02	178	1.94	2.07	1.63	1.96	2.05	1.71	1.95

Next, the frequency distributions of the ratings in Scale I given to the mosaic design constructed by different groups of subjects of grade V are shown in Table 14-19.

Some further difference will be noted in Table 14-19. Here, in the urban schools, the average rating for the boys is higher than that for the girls- a reversal of the situation obtained Grades I and II. But in the rural schools, the situation holds- the girls still have higher average than the boys- as in Grade I and II. However, the other trend holds;urban sample as a whole has a higher average than the rural sample, just as the male and female groups in the urban school have higher averages than their counterparts in the rural schools.

How the mean ratings have varied from one grade to the next, is best seen from Table 14-20, where all the various group means have been brought together.

The average ratings for scale I show two clear cut and interesting trends. First, the mean values register a rise as we go from the lowest grade to the highest grade: this is a most consistent trend. It holds for homogenous sex groups within the urban schools as well as the rural schools, it holds after pooling of ratings over the two sexes within the same grade.

Secondly, the absolute magnitude of lincrease in the average ratings, as one goes from the lowest to the highest grades, is unsystematic, over urban and rural schools Thus the male children's average has increased from the low 11.29 point in grade I to the high 14.31 points in Grade V- an increase of 2.16 points. In the rural schools, the averag for the grade I boys is 11.60 and the same for grade V is 13.50 which means an increase of 1.90 points. In the rural schools again, the average for the Grade I given is 11.47, and it rises to 13.92 in grade V, which is an increase of 2.45 points.

However, the fact remains that the urban sample

Table 14 - 20

Distributions of mean ratings in Scale I given to the mosaic designs constructed by different groups of subjects of all three Grades.

Grade and Sex		URBAN		RURAL		URBAN & RURAL	
		N	Mean	N	Mean	N	Mean
Grade I	Male	66	11.97	61	11.60	127	11.81
	Female	42	11.95	35	11.47	77	11.73
	Total	108	11.96	96	11.55	204	11.76
Grade II	Male	57	12.17	66	11.99	123	12.07
	Female	39	12.45	26	12.33	65	12.40
	Total	96	12.28	92	12.09	188	12.18
Grade V	Male	65	14.31	83	13.50	148	13.86
	Female	32	14.11	31	13.92	63	14.05
	Total	97	14.24	114	13.61	211	13.90
All Grades	Male	188	12.84	210	12.47	398	12.65
	Female	113	12.73	92	12.54	205	12.64
	Total	301	12.80	302	12.49	603	12.64

as a whole has a higher average rating than the rural sample as a whole.

We should recapitulate here briefly to capture the essentially interesting findings, so far as the pattern, of the mosaic designs are concerned. There is very strong and irrefutable evidence here that the average rating for pattern qualities of the mosaic registers a small but systematic increase as one goes from the lowest grade to the highest grade. In other words, the more mature the children, the more geometrically patterned their mosaic designs tend to become. With increasing psychological development and maturity, there is move away from amorphousness toward greater geometrically and sharpness of the designs.

2. Aesthetic quality of Mosaic Designs:

Where-as the Sub-scale I of the rating scale is meant to measure the pattern qualities of the mosaic design, the sub-scale II of the rating scale is meant to measure the aesthentic qualities of the mosaic design.

The frequency distributions of the ratings in Scale II given to the mosaic designs constructed by different groups of subjects of grade I are shown in Table 14-21.

A few interesting features of the distributions shown in Table 14-21 may be underlined. First, the girls in both urban and rural schools have higher average ratings than the boys, though the difference is not great; again both urban boys and urban girls have higher average ratings than rural boys and rural girls. As a consequence, the urban sample as a whole has higher average ratings than the rural sample as a whole. The distributions themselves, though highly skewed in the positive direction, are not too close packed at one end, but the peak is shifted away from the low end somewhat towards the middle.

The frequency distributions of ratings in Scale II given to mosaic designs constructed by different groups of subjects in Grade II are shown in Table 14 - 22.

Again, a few interesting points may be underlined in the distributions for Grade II shown in Table 14-22. First, the girls in urban schools, and also in the rural schools, have higher average ratings than boys in the urban schools and rural schools. Again, both urban boys and urban girls have higher average ratings than their counterpart in the rural schools. The urban sample as a whole ignoring sex, has higher average rating than the rural sample. Another interesting point: the shape of the frequency distributions of ratings has become more like normal, for both boys and girls, despite their predominont positive skew.

The frequency distributions for ratings in Scale II given to mosaic designs constructed by different groups of subjects of grade V have been shown in Table 14-23.

The reversal in the magnitude of the average values of ratings that was seen in Grade II is again seen in Grade V also, and in a more consistent fashion. For example, now we find that the boys of the urban schools have a higher average rating than the girls of the urban schools; this is also true for the averages for boys and girls in the rural schools- though here the average for boys is only very slightly greater than the average for the girls. As in the other two grades, the average rating for the urban sample pooled over the two sexes, is higher than that for the rural sample, also pooled over the two sexes.

But the most important point about the distributions has not been mentioned yet: the three frequency distributions for the urban sample, have become negatively skewed; the shape of the distributions for the rural schools has become more symmatrical and like normal, though here too there is a slight negative skew. This change in the shape of the distributions, from pronounced positive skew in Grade I to definite negative skew in Grade V is a most remarkable finding of this studdy. What does it really mean?

Table 14 - 21

Frequency distribution of mean ratings in Scale II given to the mosaic design constructed by different groups of subjects of Grade I

Mean ratings in Scale II	URBAN			RURAL			URBAN & RURAL		
Class Intervals	Male	Female	Total	Male	Female	Total	Male	Female	Total
16.47-18.00	2	0	2	0	2	2	2	2	4
14.94-	2	2	4	1	0	1	3	2	5
13.41-	2	6	8	4	1	5	6	7	13
11-88	13	7	20	4	5	9	17	-12	29
10.36-	14	9	23	17	6	23	31	15	46
8.83-	24	10	34	24	15	39	48	25	73
7-30-	9	8	17	11	5	17	20	14	34
Total	66	42	108	61	35	,96	127	77	204
Mean	10.85	11.05	10.93	10.34	10.56	10.42	10.61	10.83	10.
SD	2.22	2.39	2.27	1.87	.22	2.[illegible]	2.06	2.32	2.

Table 14 - 22

Frequency distributions of mean ratings in Scale II given in the mosaic designs constructed by different groups of subjects of Grade II

Mean ratings in Scale II, Class intervals	URBAN			RURAL			URBAN & RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
16.47-1800	2	3	5	1	0	1	3	3	6
14.94.	4	4	8	1	2	3	5	6	11
13.41-	5	4	9	1	2	3	6	6	12
11.88-	10	6	16	13	7	20	23	13	36
10.36-	10	9	19	16	6	22	26	15	41
8.83-	18	8	26	27	6	33	45	14	59
7.30-	8	5	13	7	3	10	15	8	23
Total	57	39	96	66	26	92	123	65	188
Mean	11.32	11.92	11.57	10.79	11.24	10.92	11.04	11.65	11.25
SD	2.44	2.69	2.55	1.81	2.12	1.90	2.13	2.48	2.26

Table 14 -23

Frequency distributions of mean ratings in scale II given to the mosaic designs constructed by different groups of subjects of Grade V

Mean rating scale II Class Intervals	Male	Female	Total	Male	Female	Total	Male	Female	Total
16.47-1800	12	6	18	8	3	11	20	9	29
14.94-	14	6	20	13	3	16	27	9	36
13.41-	12	5	17	12	6	18	24	11	35
11.88-	12	7	19	21	8	29	33	15	48
10.36-	7	5	12	14	9	23	21	14	35
8.83-	7	2	9	12	1	13	19	3	22
7.30.	1	1	2	3	1	4	4	2	6
Total	65	32	97	83	31	114	148	63	211
Mean	13.92	13.77	13.87	13.03	13.02	13.02	13.42	13.70	13.[illegible]
SD	2.62	2.59	2.60	2.48	2.19	2.[illegible]	2.55	2.40	2.[illegible]

In very simple terms, it means, that as one goes from the mosaic designs constructed by very young children to mosaic designs constructed by maturer children, their designs also tend to become more and more aesthetically satisfying. That is, developmental maturity is reflected in the aesthetic maturity of the mosaic design constructed by the children.

The wide range of the distribution of the ratings rather than these being closely packed, shows that there is considerable heterogenity within the groups- not all the children have performed well as they have grown in age.

The systematic variation in the average ratings from Scale II from grade to grade can be studied more closely by examining all the sub-group means shown together in Table 14-24.

The systematic increase in the averages of the ratings from Grade I through Grade II to Grade V has already been commented upon. But there is something more interesting: this concerns with the relatively greater increase in the averages from Grade II to Grade V compared to that from Grade I to Grade II. The following summary will make the comparison clear:

<u>Boys:</u> Increase from Grade I to Grade II is 10.85 to 11.32= 0.47 points in urban schools, and is 10.34 to 10.75= 0.45 points in rural schools.

But increase from grade II to Grade V is 11.32 to 13.92 i.e., 2.60 points in urban schools, and is 10.79 to 13.03, ie. 2.24 points in rural schools.

<u>Girls:</u> Increase from Grade I to Grade II is 11.05 to 11.95, ie., 0.90 points in urban schools and is 10.56 to 11.24 ie., 0.68 points rural schools. But increase from Grade II to V is 11.2 to 13.17 that is 1.25 points in urban schools, and is from 11.24 to 13.02, i.e., 1.78 points in rural schools. If ratings are pooled over the two sexes, then the increase is from 10.92 to 11.7 ie. 0.65 points for urban schools, and from 10.42 to 10.92 ie. 0.50 points

Table 14 - 24

Distribution of mean ratings in Scale II given to to the Mosaic designs constructed by different group of subjects of all the three grades.

GRADE & SEX		URBAN		RURAL		URBAN & RUR	
		N	Mean	N	Mean	N	Me
Grade I	Male	6[illegible]	10.85	61	10.34	127	10.
	Female	42	11.05	35	10.56	77	10.
	Total	108	10.93	96	10.42	204	10.
Grade II	Male	57	11.32	66	10.79	123	11.
	Female	39	11.92	26	11.24	65	11
	Total	96	11.57	92	10.92	188	11
Grade V	Male	65	13.92	83	13.03	148	13
	Female	32	13.77	31	13.02	63	13
	Total	97	13.87	114	13.02	211	13
All Grades	Male	188	12.05	210	11.54	398	11
	Female	113	12.12	92	11.[illegible]	205	11
	Total	301	12.08	302	[illegible]	603	11

for rural schools, for Grade I to Grade II. But when we compare the increase from Grade II to Grade V, we note that the increase is from 11.57 to 13.87 ie, 2.30 points for urban schools and from 10.92 to 13.02 ie 2.10 points for rural schools.

It is the consistency of the changes in the average values that deserves close attention. . If the ratings are pooled over urban and rural samples as well as over the two sexes, in each grade, we find the same systematic increase from one grade to the next higher grade. Thus the increase, from Grade I to Grade II in the average ratings is from Grade I to Grade II in the average ratings is from 10.72 to 11.25, ie. 0.53 points. The same increase, from Grade II to Grade V in the average ratings is from 11.25 to 13.41, ie 2.16 points.

The average increase in age of children from Grade I to Grade II is 1 year-(5 1/2 to 6 1/2 yrs.) though the theoretical range of increase in age is 0 to 2 years- 6 1/2 years being the highest age in Grade I as well as the lowest in Grade II, and 5 1/2 being the lowest in Grade I and 6 1/2 being the highest age in Grade I as well as the lowest in Grade II, and 5 1/2 being the lowest in GradeIand 7 1/2 being the highest in Grade II. But the average increase in age of children of Grade V over that for Grade II is about 3 1/4 years, though the range of increase is from 2 years to 4 1/2 years. (because the lowest age in Grade II is 6 1/2, and the highest in Grade V is 11-0, difference of 4 1/2 years; again the highest age in Grade II is 7 1/2 years and the lowest age in Grade V is 9 1/2 years- difference of only 2 years), On the average then the chronological age registers an almost 3 1/4-fold increase, as one goes from Grade II to Grade V, compared to as one goes from Grade I to Grade V.

It will be noted with great interest that the average gain in the ratings is usually 3 to 4 times in the case of the difference between grade II to Grade V, as

compared to the difference between Grade I to Grade V. It is quite clear that the increase in the average value of the ratings in the aesthetic qualities of the ratings seems to be linearly related to increase in chronological age- at least for the age range under consideration, which is 5½ years to 11 years. (ignoring the inaccuracies in-herent in the reported ages of the children), That the mosaic designs begin to assume more and more aesthetically satisfying qualities with a concomitant increase in the age of the children who are designing the mosaics, is a finding of considerable interest.

3. Miscellaneous qualities of the Mosaic Designs.

The third sub-scale for rating the mosaic designs contained three items of a miscellaneous nature. Here, the range of scores theoretically possible was from 3 to 9, rather than from 6 to 18 in the case of the first two sub-scales measuring pattern and aesthetic qualities of the designs respectively.

The frequency distributions of the ratings in sub-scale III given to the mosaic designs constructed by the different groups in Grade I are shown in Table 14-25.

Let us note, that, in the urban schools, the girls have higher average ratings than the boys: this is reversed in the rural schools, where the boys have higher average ratings than the girls. Again, the boys of urban and rural schools have the same average ratings, though the average rating for the girls of the rural schools is much lower than that for the urban schools. The frequency distributions for both the girls groups is smoother and unimodal than the same x for boys. However, all the distributions have pronounced positive skew.

The frequency distributions of ratings in Scale III given to mosaic designs constructed by different groups of subjects of grade II are shown in Table 14-26.

The trend shown by the different sub-group averages in Grade I for Scale III is replicated in Grade II

also: the girls of the rural schools have higher average rating than the boys of the urban schools- but the boys of the urban schools have a slightly higher average than the girls. Now, the boys of rural schools have higher average than the boys of the urban schools, just as the girls of the urban schools have higher average than the girls of the rural schools. The urban sample as a whole has a somewhat higher average than the rural sample.

The frequency distributions of ratings in subscale III given to mosaic designs constructed by different groups of subjects of Grade V are shown in Table 14-27.

The remarks that have been made about the distributions for grade II shown in Table 14.26, apply equally well to the distributions for Grade V, shown in Table 14-27. The girls of the urban schools have a slightly higher average than the boys of the urban schools; but boys of the rural schools have slightly higher average than the girls of the rural schools. The superiority of the urban boys and urban girls, in terms of the average value of the rating scores in this scale, over the rural boys and rural girls, is also consistant, though its absolute magnitude is not great.

The various sub-group means for this last scale have been bought together and shown in Table 14-28.

Several interesting points may be underlined here. We note that the average value of the ratings has registered a systematic increase, as we go from grade I to grade II and from grade II to Grade V. This is consistent for both urban and rural sub-samples and whole samples. Let us see how consistent these changes in the average values are.

<u>Boys:</u> The increase in the mean ratings from Grade I to Grade II is from 5.83 to 5.92 i.e. .09 points for urban boys; there is a decrease from 5.83 to 5.79, i.e. .04 points, for its rural counterpart.

The increase in the mean ratings, from grade II to grade V, is from 5.92 to 6.50, ie. 0.58 points for urban boys;

Table 14 - 25

Frequency distribution of mean ratings in Scale III given to the mosaic designs constructed by different groups of subjects of Grade I

Mean Ratings In Scale III Class Interval	URBAN			RURAL			URBAN AND RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
8.03-8.70	1	1	2	1	0	1	2	1	3
7.36-	4	4	8	3	3	6	7	7	14
6.69-	12	8	20	8	1	9	20	9	29
6.01-	5	2	7	8	3	11	13	5	18
5.34-	15	16	31	19	8	27	34	24	58
4.67-	24	9	33	17	13	30	41	22	63
4.00-	5	2	7	5	7	12	10	9	19
Total	66	42	108	61	35	96	127	77	204
Mean	5.83	6.09	5.93	5.83	5.50	5.71	5.83	5.82	5
SD	1.03	1.00	1.02	0.98	1.00	0.99	1.01	1.00	1

Table 14 - 26

Frequency distributions of mean ratings in Scale III given to the mosaic designs constructed by different groups of subjects of Grade II.

Mean Ratings in Scale III Class Intervals	URBAN			RURAL			URBAN AND RURAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
8.03-8.70	0	0	0	0	0	0	0	0	0
.36-	1	2	3	2	0	2	3	2	5
.69-	16	12	28	10	8	18	26	20	46
.01-	10	3	13	8	0	8	18	3	21
.34-	10	11	21	22	5	27	32	16	48
.67-	1	10	28	21	12	23	39	22	61
.00-	2	1	3	3	1	4	5	2	7
Total	57	39	96	66	26	92	123	65	188
Mean	5.92	6.07	5.98	5.79	5.77	5.78	5.85	5.95	5.88
SD	0.92	0.89	0.91	0.80	0.93	0.83	0.86	0.91	0.87

Table 14 - 27

Frequency distributions of Mean ratings in Scale III Given to the mosaic designs constructed by different groups or subjects of Grade V.

Mean Ratings in Scale III Class Intervals	Male	Female	Total	Male	Female	Total	Male	Female	Total
8.03-8.70	2	0	2	0	0	0	2	0	2
7.36-	5	4	9	7	4	11	12	8	20
6.69-	31	15	46	34	9	43	65	24	89
6.01-	8	7	15	15	3	18	23	10	33
5.34-	9	1	10	14	10	24	23	11	34
4.67-	9	5	14	10	5	15	19	10	29
4.00-	1	0	1	3	0	3	4	0	4
Total	65	32	97	83	31	114	148	63	211
Mean	6.50	6.59	6.53	6.40	6.35	6.39	6.44	6.47	6.4
SD	0.87	0.82	0.85	0.87	0.89	0.88	0.87	0.86	0.8

Table 14 - 28

Distribution of mean values of ratings in Scale III given to the mosaic designs constructed by different groups of subjects of all the three grades.

GRADE & SEX		URBAN		RURAL		URBAN AND RURAL	
		N	MEAN	N	MEAN	N	MEAN
Grade I	Male	66	5.83	61	5.83	127	5.83
	Female	42	6.09	35	5.50	77	5.82
	Total	108	5.93	96	5.71	240	5.82
Grade II	Male	57	5.92	66	5.79	123	5.85
	Female	39	6.07	26	5.77	65	5.95
	Total	96	5.98	92	5.78	188	5.88
Grade V	Male	65	6.50	83	6.40	148	6.44
	female	32	6.59	31	6.35	63	6.47
	Total	97	6.53	114	6.39	211	6.45
All Grades	Male	188	6.09	210	6.04	398	6.06
	Female	113	6.05	92	5.86	205	5.96
	Total	301	6.07	302	5.99	603	6.03

there is an increase from 5.79 to 6.40, ie. 0.61 points for their rural counterpart.

If the averages for rural and urban boys are pooled then we see that from Grade I to Grade II there is an increase from 5.83 to 5.85 ie. 0.05 points, but the same, from Grade II to GradeVis from 5.85 to 6.44, i.e., 0.59 points.

There is a slight decrease in the mean ratings from Grade I to Grade, from 6.09 to 6.07, ie. -0.02 points for urban girls; but there is an increase from 5.50 to 5.77 ie. 0.27 points for their rural counterpart.

However, the increase in the mean ratings, from Grade II to Grade V. is from 6.07 to 6.59, ie. 0.52 points, for urban girls; but the same is from 5.77 to 6.35, ie 0.58 points for their rural counterparts.

The ratings for girls, pooled over urban and rural schools, register an increase in the average value from Grade I to Grade from 5.82 to 5.95 ie. 0.13 points; but the increase from grade II to Grade V, is from 5.95 to 6.47, ie. 0.52 points.

The conclusion then, is inescapable that, even in the third subscale, where only three miscellaneous qualities of the mosaic designs are rated, there is a slight but consistent increase in the average value of ratings given to the mosaic designs, as one goes from the mosaic of very young children of Grade I to the relatively maturer students of Grade V. In other words, the quality of the mosaic designs as a whole begins to show systematic changes as a function of the maturity of the subjects who create the mosaics.

These things can be gone into in greater detail if we take into consideration the scores obtained by the mosaic designs in the entire scale, that is, the ratings from the three different subscales are summed for each mosaic designs. This is done in the next section.

4. **Qualitative features of the Mosaic - Assessment by the entire Rating Scale.**

The range of the rating scores for the entire 15 items scale, obtained by summing over the three subscales, is 9 to 45 with a median of 30.

The frequency distributions of entire scale scores given to mosaic designs constructed by the different groups of subjects of Grade I are shown in Table 14 - 29.

Let us note, that for the distributions for Grade I, the girls in the urban schools have a slightly higher average than the boys of the urban schools; the situation is just reversed in the case of rural groups where the average for the boys is slightly higher than that of the girls. If the rating scores are pooled over the two sexes, the girls still have a slight advantage over the boys. The urban sample has a slight advantage over the rural sample.

The frequency distributions of ratings in the entire scale given to the mosaic designs constructed by different groups of subjects of Grade II are shown in Table 14 - 30.

Now we note that there is a slight change in the situation, in that, not only the urban girls have a higher average rating than the urban boys, but the rural girls have also a higher average than the rural boys. As before, the urban sample as a whole has a higher average than the rural sample as a whole.

The frequency distributions of ratings in the entire scale given to the mosaic designs constructed by different groups of subjects of Grade V have been shown in Table 14 - 31.

When we look into the distributions shown in Table 14.31 for groups within Grade V, we find that ~~t~~ here the boys in the urban schools have a higher average than the girls in the urban schools. But in the rural schools; the girls have the higher average, as in the other two grades the urban sample as a whole has a higher average than the rural

Table 14 - 29

Frequency distributions of means of total ratings on the three scales given to the mosaic designs constructed by by the different groups of subjects of Grade I.

Total of ratings of three Scale Class Intervals.	URBAN			RURAL			URBAN AND RURA[L]		
	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOT[AL]
39.4-42.7	1	1	2	1	1	2	2	2	4
36.2-	4	4	8	4	1	5	8	5	13
32.9-	9	6	15	0	2	2	9	8	17
29.7-	9	6	15	11	7	18	20	13	33
26.4-	18	12	30	20	9	29	38	21	59
23.2-	18	7	25	17	7	24	35	14	49
19.9-	7	6	13	8	8	16	15	14	29
Total	66	42	108	61	35	96	127	77	204
Mean	28.53	29.09	28.75	27.77	27.52	27.58	28.17	28.37	28.2[illegible]
SD	4.88	5.06	4.94	4.18	4.67	4.38	4.55	4.98	4.6[illegible]

Table 14 - 30

Frequency distributions of means of total ratings on the three scales given to the mosaic designs constructed by the different groups of subjects of Grade II.

Total of ratings of three scale Class Intervals.	URBAN			RURAL			URBAN AND RURAL		
	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL
39.4-42.7	2	3	5	1	0	1	3	3	6
36.2-	8	3	11	1	2	3	9	5	14
32.9-	2	7	9	9	2	11	11	9	20
29.7-	10	9	19	12	9	21	22	18	40
26.4-	17	5	22	20	5	25	37	10	47
23.2-	13	9	22	19	7	26	32	16	48
19.9-	5	3	8	4	1	5	9	4	13
Total	57	39	96	66	26	92	123	65	188
Mean	29.38	30.45	29.81	28.66	29.34	28.85	28.99	30.00	29.34
SD	5.03	5.54	5.24	4.07	4.39	4.15	4.54	5.12	4.74

the rural sample. The shape of the distributions has also changed from positive skew to negative skew.

The above relationship, and a few more are seen more advantageously when we look into the various group means for the entire scale, as shown in Table 14-32.

It will be worthwhile to underline the trends in the variation of the average scale values as we go from group to group.

Male: The average scale value has increased from Grade I to Grade II in the urban schools, from 28.53 to 29.38, ie. 0.85 points, but the scale value has increased from Grade I to Grade II from 27.77 to 28.66 ie by 0.89 points, but the average scale value has increased from Grade II to Grade V, from 28.66 to 32.93 ie by 4.27 points.

If scores are pooled over urban and rural schools, we find that average scale vlaue has increased from Grade I to Grade II from 28.77 to 28.99 io. by 0.82 points but the same average has increased from Grade II to Grade V from 28.99 to 33.65, i.e. by 4.66 points. The average school value has increased from Grade I to Grade II from 29.09 to 30.45, i.e. by 1.36 points, but the same average scale value has increased from Grade II to Grade V, from 30.45 to 34.47, ie. by 4.02 points. In the rural schools the situation is similar. The average has increased from Grade I to Grade II, from 27.52 to 29.34, ie by 1.82 points; but the same average value has increased from Grade II to Grade V. from 29.34 to 33.32, ie, by 3.98 points. If the scores are pooled over urban and rural schools, then we find, that the average has increased from Grade I to Grade II, from 28.29 to 30.00 ie. by 1.71 points; but it has increased from Grade II to Grade V, from 30.00 to 33.90 ie., by 3.90 points.

Lastly, the urban children's average is greater than that from the rural children, for each of the three Grade, though the difference is never very much.

We can summarise by stating that the rating scale scores, whether the subscales are considered separately, or the entire scale score are considered, show a very systematic

Table 14 - 31

Frequency distributions of means of total ratings on the three scales given to the mosaic designs constructed by the different groups of subjects of Grade V.

URBAN			RURAL			URBAN & RURAL		
MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FE-MALE	TOTAL
15	3	18	7	2	9	22	5	27
12	10	22	20	5	25	32	15	47
14	10	24	14	10	24	28	20	48
10	4	14	17	7	24	27	11	38
8	3	11	19	5	24	27	8	35
6	1	7	4	2	6	10	3	13
0	1	1	2	0	2	2	1	3
65	32	97	83	31	114	148	63	211
24.57	24.47	34.54	32.93	33.32	33.03	33.65	33.90	33.72
5.20	4.46	4.94	4.98	4.25	4.78	5.08	4.36	4.86

Table 14-32

Distributions of the values of means of total ratings in the three scales given to the mosaic designs constructed by the different groups of subjects of all these three grades.

GRADE & SEX		URBAN		RURAL		URBAN AND RURAL	
		N	MEAN	N	MEAN	N	MEAN
Grade I	Male	66	28.53	61	27.77	127	28.17
	Female	42	29.09	35	27.52	77	28.37
	Total	108	28.75	96	27.68	204	28.24
Grade II	Male	57	29.38	66	28.66	123	28.99
	Female	39	30.45	26	29.34	65	30.00
	Total	96	29.81	92	28.85	188	29.34
Grade V	Male	65	34.57	83	32.93	148	33.65
	Female	32	34.47	31	33.32	63	33.90
	Total	97	34.54	114	33.03	211	33.72
All Grades	Male	188	30.87	210	30.07	398	30.46
	Female	113	31.08	92	29.99	205	30.59
	Total	301	30.95	302	30.06	603	30.35

inter-relationship with the age-grade status of the subjects who have produced the mosaic designs. Not only is that relation monotonic, but the increase in the rating seems to be have a functional relationship with increase in chronological age. The subjective qualities of the mosaics, if rated by simple scales of the types used here and averaged over judges, do reflect certain developmental trends in the subjects- brought about due to biological factores, due to environmental factors, and due to schooling factors. The more developed the child in a psycho-biological sense, the higher the rating will his mosaic tend to obtain, in terms of purely subjective features that he endows his design with.

This finding is undoubtedly of signal interest. The mosaic patterns will have features- both objective and subjective. which would reflect the stage of psychological development reached by the subject. Thus the mosaic test appears to be a tool with considerable premise for measuring psychological development- of children of at least the age group being studied here, viz 5½ to 11 years, The inter-relationship of the various scores associated with the mosaic designs with other measures obtained from the administration of other tools, may be worth studying in detail, which will be done in later sections of this report.

------- 000 -------

Chapter 15

Correlation between Different Variables

In these Chapter we propose to consider in some detail how the different variables are correlated with each other. Since such a large number of variables is involved, it will not do to take each individual variable separately x and see how it correlates with the remaining variables. It will be more economic to take groups of variables as units, and consider how these variables are correlated among themselves, or variables of one group correlate with variables of another group. For this purpose, the grouping of variables that has been implicit in the design of this study can provide a useful frame-work. The first broad categorization is between two classes of variables: the Independent variables, and the Dependent variables. Within each of these two broad classes, there are a few compact clusters, as can be seen from the list given below:

Independent Variables

I. Family Background and Socio-economic status variables.

(1) Father's education

(2) Mother's education

(3) Father's occupation

(4) Mother's occupation

(5) Income

(6) Religion

(7) Caste

(8) LinSES Score.

II. School Variables.

(1) School management

(2) School composition

(3) School size

(4) Shift System

(5) Medium of instruction

(6) Teacher Qualification

(7) Teacher-pupil Ratio

(8) School Equipment and Facilities.

(9) LinSES Scores.

In the first cluster, there are 7 variables, the first five of which, have ordered categories, within themselves. These rank orders ranged from 0 to 7 for the first two variables, viz., father's education, and mother's education; it ranges from 0 to 8, for the next three variables viz., Father's occupation, mother's occupation, and income, The sixth variable, religion has 8 categories which can not be ordered, but are purely qualitative categories. The seventh one-caste-even though has 7 qualitative categories, can be ordered, by making use of the traditional, built-in hierarchy already known to be pre-valent in our society.

For the purpose of correlational analysis, the rank-orders of the first five family background or socio-economic variables have been used as scores, and then these have been correlated with scores of other variables. Further, a compsite score which will be something like a socio-economic status index, has been derived by obtaining a simple linear unweighted sum of the rank order of each category of the first five variables, and a combined rank-order score for the two variables Religion-cum-caste, considered together-using the following scoring plan:

Hindu-Scheduled Caste	gets a score of	1.
Hindu, scheduled tribe	gets a score of	2.
Hindu-Backward caste	gets a score of	3.
Muslim	gets a score of	3.
Christian	gets a score of	3.
Sikh	gets a score of	3.
Hindu Upper Caste	gets a score of	4.

This composite 'Linear sum of socio-economic status estimator scores' has been called LinSES in this study. It has a range from a minimum score of 2 to a maximum possible score of [illegible]

This LinSES score can be correlated with scores of other variables.

Thus, straight forward product-moment correlations with each of the first five background variables singly, and the composite LinSES variable, as independent variables, and other variable treated as dependent variables, have been computed.

Among the 8 school variables, only the last three viz., Teach-qualification, Teacher-pupil ratio and school equipment and facilities, have got ordered categories. The first five variables have only qualitative categories within themselves, and straight-forward product-moment correlations cannot be calculated with these variables. The rank-orders of the last three variables can be used as scores for correlating with other variables. Just as in the case of socio-economic status variables, a composite variable, called "Linear sum of score excellence category socre", or LinSEC score, in short, has been derived, by taking the simple unweighted sum of the rank-order score of each of the three last-mentioned variables, viz., Teacher-qualification, Teacher-pupil ratio, and School Equipment and Facilities. The LinSEC variable has a range from a minimum score of 3 to a maximum possible score of 9.

So under this class of school variables, there ~~xx~~ are 4 variables, including the composites LinSEC variable, which can be correlated in straight-forward fashion with scores of other variables.

Under the heading of Dependent variables, we have used three sub-categories:

I. Intervening variables:

(1) Mental Age

(2) Intelligence Quotient

(3) Social Maturity

(4) Moral relativism

(5) Sociometric Status Index of Popularity.

II. School Achievement Variables:

(1) Achievement in Hindi-Language-Sub-Test I

(2) Achievement in Hindi Language-Sub-Test II

(3) Achievement in Hindi Language-Sub-Test III

(4) Achievement in Hindi Language-Total Score.

(5) Achievement in Mathematics.

III. Performance in the Mosaic Test.

(1) Time taken to complete the mosaic design.

(2) Total number of pieces used to complete the design.

(3) Number of subdesigns used.

(4) Area covered in the design.

(5) Rating obtained in Scale I- Pattern qualities of the design.

(6) Rating obtained in Scale II- Aesthetic qualities of the design.

(7) Rating obtained in Scale II- dis------- qualities of the design.

(8) Total of three rating scales I + II + III.

Since each of the variables listed above, gives rise to scores in interval scores, these can be correlated with scores from the family background variables, and school variables, as well as those can be inter-correlated among each other.

It will be seen that the total number of variables which can be used for computation of correlations, is 28 (6 for background variables, 4 for school variables, 5 for intervening variables, 5 for achievement test variables, and 8 for mosaic test variables). These may give rise to 378 correlations, some of which of course might be of little scientific interest. Keeping these groups of variables in mind, we can now turn to their systematic consideration.

I. Inter-correlation among the Intervening and Achievement Test Variables.

The product-moment coefficients of correlation among the 5 intervening and the 5 achievement test variables for small homogenous groups, consisting of a single grade, for schools of one type of location, viz., urban schools,

have been shown in Tables 16-1, and for rural schools, have been shown in Table 16-2.

First, for Grade I, boys, we find that - mental age correlates quite substantially with the remaining intervening variables with the exception of one, viz., sociometric status index, and also with all the 5 achievement test variables. The same thing is repeated with IQ which is derived from 'mental age'.

'Social maturity' correlates moderately with mental age, IQ, and moral relativism, among the intervening variables, and also moderately with Sub-test I of Hindi achievement, and Mathematics achievement tests. Moral relativism correlates moderately with mental age, IQ., and social maturity, and also with all the five achievement test variables. 'Sociemetric status index' has positive correlations with all other variables, but none reaches significance even at .05 level. All the achievement tests correlate quite high with each other. In fact, here the lowest correlation coefficient is .785 and the highest is .972; of course, 'mental age' and IQ correlates very ghighly .975 to be exact.

When we turn to the correlations figures for the girls of Grade I (Urban schools), we find that the trend is replicated, but almost all the correlation values have dwindled somewhat in size, and some have even become low negative. We find that 'mental age' now has only a low positive correlation with social maturity. The correlation between mental age and IQ on onehand and the achievement vaiables are still moderately high, but only a few reach significance at .01 level, the remaining being significant at .05 level. But social maturity, moral relativism, and sociometric status, have low positive, or low negative correlations with the achievement test variables. Comparatively speaking, moral relativism has higher correlations with achievement variables than either social maturity or sociometric status.

Table 15 - 1

Product-moment inter-correlations among the intervening and achievement test variables for grade I subjects of urban schools.

VARIABLES	Intervening 1	2	3	4	5	Achievement 6	7	8	9	10
Male (N = 66)										
1. Mental age		975**	307 *	273*	092	432**	453**	560**	528**	478**
2. I.Q.	-	-	311 *	265*	124	463**	468**	577**	549**	534**
3. Social Maturity			-	306*	183	264*	185	200	228*	300*
4. Moral Relat.				-	177	339**	370**	391**	391**	389**
5. Sociom Stat.Index						194	192	124	167	152
6. Lang Ach.I						-	825**	800**	911**	802**
7. Lang Ach.II							-	916**	952**	805**
8. Lang Ach.II								-	972**	785**
9. Lang Ach. Total									-	835**
10. Maths Ach.										835**
Female (N=42)										
1. Mental Age	-	965**	039	430**	-120	359*	367*	346*	368*	369*
2. I.Q.		-	070	476**	-072	402**	396**	388*	410**	409**
3. Social Maturity			-	026	-072	-006	-025	017	002	.318
4. Moral Relat.				-	127	109	277	174	184	097
5. Sociom. S.I						039	-023	-034	-035	-097
6. Lang Ach. I						-	844**	835**	920**	711**
7. Lang Ach. II							-	941**	964**	714**
8. Lang Ach. III								-	981**	721**
9. Lang Ach. Total									-	746**
10. Maths. Ach.										

* p $<$ .05; ** p $<$ .01.

Table 15 - 2.

Product-moment inter-correlations among the intervening and achievement test variables for Grade I subjects of rural schools.

VARIABLES	Intervening					Achievement				
	1	2	3	4	5	6	7	8	9	10
Male - (N = 61)										
Mental Age	-	963**	127	-005	219	158	-017	037	081	074
I.Q.		-	135	-016	303**	162	-067	012	060	075
Soc.Mat.			-	193	-173	112	121	005	078	-003
Moral Relat.				-	-090	116	308**	275*	246	424**
Sociom. Ind.					-	137	-091	109	088	024
Lang Ach. I						-	.662**	659**	886**	643**
Lang Ach. II							-	751**	860**	629**
Lang Ach. III								-	916**	671**
Lang Ach. Total									-	730**
10.Maths. Ach.										
Female (N = 35)										
Mental Age	-	981**	-010	269	-118	494**	207	258	340*	539**
I.Q.		-	-085	322	-078	456**	182	240	314	535**
Soc. Mat.			-	-269	-218	-193	-236	-307	-263	-202
Moral Relat.				-	069	284	252	311	303	470**
Sociom. Ind.					-	-205	-105	-037	-108	-032
Lang Ach. I						-	869**	814**	932**	771**
Lang Ach. II							-	938**	969**	741**
Lang Ach. III								-	964**	728**
Lang Ach. Total									-	771**
10.Maths. Ach.										-

* $p < .05$; ** $p < .01$

The achievement test variables correlate quite highly among themselves, as in the case of male grade I subjects.

When we turn to correlations for Grade I boys and girls of the rural schools, we note that the trend is replicated, but the correlations in general have been reduced still further. Mental age, intelligence quotient, and moral relativism tend to have higher correlations with other variables. However, the inter-correlations with other variables. However, the inter-correlations among the achievement tests themselves, as a group, remain quite high.

In the girls group of Grade I in rural schools, the trend is in general a replication of that in the boys group, but there are some notable exceptions also. First, whereas in the boys group, both mental age and IQ have correlated poorly - with all remaining variables, this is not so in the girls group. In the boys group the only significant correlation is between IQ and sociometric status (.303, $p < .05$). But in the girls group, with IQ and mental age as one of the variables, there are 6 correlations which are large enough to be significant at .01 level, and 3 correlations which are significant at .05 level. In the girls group social maturity, however, correlates negatively with all other variables. But moral relativism tends to have somewhat moderate positive correlations with other variables; 6 correlations are significant beyond .05 level, and one significant beyond .01 level. Sociometric status has usually low negative correlations with other variables.

Let us now turn to the correlation values obtained from subjects of Grade II. The correlations for urban school subjects and rural school subjects have been shown in Table 15-3 and 15-4.

First, it will be seen that, in both boys and girls groups, mental age and IQ, have moderate correlations with other variables. In fact, the correlation values

Table 15 - 3

Product-movement inter-correlations among the intervening and achievement test variables for grade II of urban schools.

VARIABLES	Intervening					Achievement				
	1	2	3	4	5	6	7	8	9	10
Male (N = 57)										
1. Mental Age		967@	-010	-060	-116	392@	457@	085	423@	433@
2. I. Q.		-	022	-031	-129	406@	473@	104	440@	403@
3. Soc. Mat.			-	-083	179	142	124	168	149	096
4. Moral Relat.				-	-006	000	032	093	039	-084
5. Sociom. Index					-	052	-185	-083	-133	012
6. Lang Ach. I						-	730@	617@	845@	663@
7. Lang Ach. II							-	587@	970@	629@
8. Lang Ach. III								-	731@	546@
9. Lang Ach. Total									-	687@
10. Maths. Ach.										-
Female (N = 39)										
1. Mental Age		985@	122	251	209	332*	486@	557@	524@	432@
2. I.Q.		-	162	265	207	302	478@	546@	510@	411@
3. Soc. Mat.			-	255	256	108	108	177	135	112
4. Moral Relat.				-	-076	207	263	170	265	541@
5. Sociom. Index					-	148	244	259	257	178
6. Lang Ach. I						-	676@	532@	802@	434@
7. Lang Ach. II							-	567@	968@	510@
8. Lang Ach. III								-	711@	504@
9. Lang Ach. Total									-	554@
10. Maths. Ach.										

* P ∠ .05; @ P ∠ .01.

Table 15 - 4.

Product-moment inter-correlations among intervening and achievement test variables for subjects of grade II Rural Schools.

VARIABLES	Intervening					Achievement				
	1	2	3	4	5	6	7	8	9	10
Male (N=66)										
1. Mental Age		980@	102	-034	010	095	270	-024	215	-112
2. I.Q.		-	055	-081	-039	097	281	-032	217	-115
3. Soc.Mat.			-	187	013	265*	231	252*	263*	179
4. Moral Relat.				-	-353	075	165	-008	143	119
5. Sociom Ind.					-	029	-019	-089	-003	095
6. Lang Ach.I						-	610@	686@	802@	648@
7. Lang Ach.II							-	473@	936@	519@
8. Lang Ach. III								-	651@	575@
9. Lang Ach.Total									-	629@
10. Maths.Ach.										-
Female (N=26)										
1. Mental Age		992@	-126	129	269	333	521@	274	531@	176
2. I.Q.		-	-010	104	282	327	541@	289	547@	156
3. Soc.Mat.			-	198	332	-193	-024	046	-067	-136
4. Moral Relat.				-	302	437*	313	488*	435*	510@
5. Sociom.Ind.					-	168	229	283	264	-129
6. Lang Ach. I						-	355	574@	641@	489*
7. Lang Ach. II							-	522@	938@	437*
8. Lang Ach. III								-	708@	588@
9. Lang Ach. Total									-	559@
10. Maths.Ach.										-

* P ∠ .05; @ P ∠ .01.

are somewhat larger among girls than among boys in the urban schools. This is also true for the boys and girls of the rural schools.

Another noteworthy fact is about the correlations that social maturity has with other variables. These are generally low positive, with a few being low negative, for urban boys. These are slightly larger in urban girls- there being no negative correlations in this group. In the rural schools, for the boys group, the correlations are somewhat larger. They are much reduced for the rural girls group -- and many of these become negative also.

The situation is also somewhat similar for moral relativism. It correlates poorly with other variables for urban boys, as well as rural boys. But the very same correlations become larger among urban girls, and still larger among rural girls. Thus, among urban boys, none of the correlations of moral relativism with any other variable reaches significance at .05 level; the same situation obtains for rural boys also. But in the girls of the urban schools, eight correlations are low-positive, and only one low negative (with sociometric index), but among girls of the rural schools, all the 9 correlations are positive, one of them is significant beyond .01 level, and 3 of them are significant beyond .05 level.

Coming to the sociometric status variable, we find similar and interesting group differences. For urban boys of this grade, correlation of sociometric status with all other variables are mostly negative, but low- the line exception being, with moral relativism, which is low positive. This is also the situation with rural boys. But with rural girls, all the correlations are low positive, save one, with moral relativism, where it is low negative. This is the trend in rural girls also, only the correlation values become a little larger. Whereas the correlation of sociometric index with moral relativism becomes low positive, it, however,

becomes low negative with mathematics achievement, while it is low positive in case of rural girls.

The inter-correlation among the achievement test variables are uniformly high positive in all the four groups- urban boys and girls, and rural boys and girls.

Next, we can turn to the correlation data obtained from Grade V subjects, which are shown in Tables 15-5, and 15-6.

First we note that, both mental age and IQ have moderately valued correlations with other variables in Grade V urban boys. The situation is quite similar in urban girls also. In the urban boys group, out of 18 correlations, that mental age and IQ have with other variables, 2 are significant at .05 level, and 8 are significant beyond .01 level. In the urban girls group, there are four correlations which are significant at .05 level, and there are 8 correlations which are significant at .01 level. For the rural boys and girls groups, these correlations become much smaller in size. Only 2 correlations in the rural boys group (Grade V), and only one in the rural girls group, reach significance at .05 level. Some of the correlations become negative also.

Social maturity has mostly low negative correlations with other variables, with a few low positive correlations, in both urban boys and girls groups. For the rural boys and girls groups, correlations of oth r variables with social maturity follow the same trend, but there are a few more positive correlations to be found among rural boys group.

Moral relativism shows a very interesting trend: usually it has moderately valued positive correlations with other variables, for all the 4 homogenous sex groups. For example, for urban boys group, only one correlation is negative and of the remaining 8, 3 are significant at .05 level, and 2 at .01 level. For urban girls group, again one is negative, and of the remaining 8 correlations all of which

are positive three are significant at .05 level, and 4 are significant at .01 level. In the rural boys group, 3 correlations are low negative, and the remaining 6 are low positive, but none reaching significance at even .05 level. But in the rural girls group, only 2 correlations are negative, and of the remaining 7 positive correlations, 2 are significant at .05 level, and 3 at .01 level. Correlations of sociometric status with other variables show some equally interesting trends. In urban boys group, all the 9 correlations are low positive, none reaching significance at .05 level. But in the urban girls group, not only are all the correlations positive, 4 of them are significant at .05 level, and one at .01 level, only 3 correlations fail to reach significance at .05 level. The situation is very similar in rural boys group too. Here, again all a correlations are positive, among which 1 is significant at .05 level, and 4 are significant at .07 level. The correlation values dwindle again in the girls group in the rural schools. Here, out of 9 correlations 2 are negative; out of the seven positive correlations none reaches significance at even .05 level.

In all the 4 groups, inter-correlation among the 5 achievement test variables are of uniformly moderately high value.

The overall trend of the inter-correlations among the variables, as one goes from group to group, within the same grade, and from grade to grade, can be recapitulated here:

(1) Mental age and intelligence quotient have usually high correlations with most achievement test variables, and moderately valued correlations with other intervening variables.

(2) The achievement tests have high correlations among themselves, for all groups.

(3) Social maturity, moral relativism, and sociometric status have shown certain systematic

Table 15 - 5

Product moment inter-correlations among intervening and achievement test variables for Grade V urban school subjects.

VARIABLES	Intervening					Achievement Test				
	1	2	3	4	5	6	7	8	9	10
Male (N=65)										
1. Mental Age	-	970@	123	147	106	264*	399@	408@	381@	447@
2. I.Q.		-	114	136	125	281*	372@	382@	369@	392@
3. Soc. Mat.			-	-192	008	-074	-197	-255	-185	-097
4. Moral Relat.				-	126	373@	413@	485@	458@	402@
5. Sociom Ind.						008	049	092	076	074
6. Lang Ach.I						-	830@	704@	922@	364@
7. Lang Ach.II							-	812@	946@	486@
8. Lang Ach.III								-	905@	632@
9. Lang Ach.Total									-	530@
10. Maths. Ach.										-
Female (N=32)										
1. Mental Age	.	985@	-299	474@	376*	369*	189	498@	459@	492@
2. I. Q.		.	-249	470@	391*	365*	199	471@	449@	509@
3. Soc. Mat.			.	-266	232	-070	-087	-258	-175	-265
4. Moral Relat.				.	169	372*	393*	585@	568@	346
5. Sociom Ind.					.	326	406*	119	350*	544@
6. Lang Ach.I						.	621@	370*	861@	471@
7. Lang Ach.II							.	317	784@	542@
8. Lang Ach.III								.	720@	486@
9. Lang Ach.Total									.	625@
10. Maths.Ach.										

* P ∠.05; @ P ∠.01

Table 15 - 6.

Product-moment inter-correlations among intervening and achievement test variables for Grade V Rural school subjects.

VARIABLES	Intervening					Achievement				
	1	2	3	4	5	6	7	8	9	10
Male (N=83)										
1. Mental Age	.	986@	016	-101	170	119	081	198	151	224*
2. I.Q.		.	-010	-120	162	142	092	212	170	219*
3. Soc.Mat.			.	-204	068	-014	051	029	016	014
4. Moral Relat.				.	098	129	158	163	175	184
5. Sociom.Ind.					.	305@	235*	321@	332@	402@
6. Lang Ach.I						.	727@	665@	927@	462@
7. Lang Ach.II								559@	865@	492@
8. Lang Ach.III								.	825@	492@
9. Lang Ach.Total									.	544@
10. Maths. Ach.										.
Female (N=31)										
1. Mental Age	.	989@	-174	-63	-093	090	369*	208	252	197
2. I.Q.		.	-131	-094	-107	036	345	158	197	160
3. Soc. Mat.			.	017	109	088	183	-384*	-070	-243
4. Moral Relat.				.	069	360	540@	387*	511@	503@
5. Sociom.Ind.					.	134	209	176	207	232
6. Lang Ach.I						.	655@	423*	862@	463@
7. Lang Ach.II							.	412*	807@	425*
8. Lang Ach.III								.	771@	709@
9. Lang Ach.Total									.	665@
10. Maths.Ach.										.

* P ∠ .05; @ P ∠ .01

variations in their patterns of correlation with other variables, as one goes from urban to rural, or from boys to girls, or from lower to higher grade groups.

Some of the variability in the pattern and size of correlations between the same pair of variables, as we go from one grade to another, or from one sex to another within the same grade, or from school of the urban locations to rural locations, must be attributed to sampling fluctuations, specially due to small size of the samples in each subgroup. Because of homogeniety within the groups, there is restriction on the range of scores of both the variables being correlated, and this results in lowering of correlation values themselves.

Some of these violent fluctuations can be controlled by calculating the correlations for all the boys and girls of the same grade from all the urban schools being pooled together. The same procedure can be adapted for rural schools also. The correlations obtained from such large groups, though hetrogenous in terms of sex, will be free from some of the sampling errors related to small size of samples.

The inter-correlations among the same 10 variables for the 108 subjects of Grade I of the urban schools, and 96 subject of Grade I of the rural schools are shown in Table 15 - 7.

First, if we look at the correlation values for the urban school Grade I boys and girls, we find some interesting trends.

(1) Both mental age and intelligence quotient have moderately positive correlations with the remaining variables -- with the exception of 'sociometric index' - with which the correlations are only low positive, but are not significant at even .05 level. All the above correlations are significant at better than .01 level.

(2) 'Social maturity' now is seen to have moderately valued correlations with all the remaining variables reaching significance at .05 level, with 'moral relativism and 'mental age' and at '.01 level with, 'intelligence quotient' and ' mathematics achievement'. With the remaining variables the correlations, though positive, are too low to reach significance at even .05 level.

(3) 'Moral relativism' has positive correlations which are significant at .05 level with social maturity' and language sub-test - I; and significant at .01 level with 'mental age', 'intelligence quotient', language sub-tests II, III, and Total, and Mathematics Achievement Test. Its correlation with 'sociometric status' is low positive, which misses significance at .05 level.

(4) 'Sociometric Status' has low positive correlation with all the remaining variables - none of which reaches significance even at .05 level.

Correlations among the subtests of the language aschievement test, and the mathematics achiovement test, are all high and positive, and all significant for beyond .001 level.

If we now consider the correlations for rural school Grade I boys and girls, we are at once struck with one fact: almost all the correlation values are lower than their corresponding counterparts in the urban sample. Thus:

(1) Both 'mental age' and 'IQ' correlate positively with all the other variables - but the values are not very high: with 'mental age' there are only two correlations which reach significance at .05 level - these are with sub-test

I of Language achievement, and with 'mathematics achievement test'. With IQ, there are likewise with 3 correlations which reach significance at .05 level: these are the same two tests as above, and the third is with 'sociometric status index'.

(2) With 'social maturity' the situation is worse- it correlates negatively with all the remaining variables, though, none of the values reach significance at even .05 level.

(3) With the next variable, 'moral relativism' the correlation values are very similar to those in the urban sample. There is a tendency for the correlation values to be somewhat lower than their counterparts in the urban sample - but this is not very consistent, as there are some reversals also. Three of the 4 correlations with the language tests are significant beyond .05 level; the correlation with 'mathematics achievement' increases to .434, which is significant beyond .01 level, the corresponding correlation in the urban sample being only .272. However, correlation with 'social maturity' has gone down to .045 in the rural sample compared to .157 in the urban sample.

(4) With the last intervening variable 'sociometric status index', the same trend - of lowering of the correlation values towards zero, is to be seen. One of the correlations reach significance even at .05 level, and one of them has become negative (with Language achievement Sub-test II).

It is also note-worthy that the inter-correlations among the achievement tests - language and mathematics - are

Table 15 - 7.

Product-moment inter correlations among intervening and achievement test variables of all Grade I subjects in urban and rural schools.

VARIABLES	Intervening					Achievement				
	1	2	3	4	5	6	7	8	9	10
URBAN-Male+Female N = 108										
1. Mental Age	.	973**	232*	335**	020	372**	381**	441**	428**	422**
2. I.Q.		.	249*	347*	058	401**	396**	460**	451**	468**
3. Soc.Mat.			.	208*	077	106	044	068	078	268**
4. Moral Relat.				.	157	232*	306**	280**	284**	272**
5. Sociom.Ind.					.	113	109	066	092	068
6. Lang Ach.I						.	836**	819**	917**	773**
7. Lang Ach.II							.	929**	958**	770**
8. Lang Ach.II								.	977**	762**
9. Lang Ach.Total									.	803**
10. Maths.Ach.										.
Rural-Male+Female N = 96										
1. Mental Age	.	971**	126	072	138	283**	054	101	171	258*
2. I.Q.		.	106	082	209*	272**	014	078	147	253*
3. Soc.Mat.			.	-027	-162	-002	-033	-153	-077	-072
4. Moral Relat.				.	-045	179	287**	296**	272**	434**
5. Sociom.Ind.					.	037	-096	050	021	011
6. Lang Ach.I						.	740**	716**	901**	696**
7. Lang Ach.II							.	829**	904**	671**
8. Lang Ach.II								.	937**	687**
9. Lang Ach.Total									.	744**
10. Maths.Ach.										.

* P < .05; ** P < .01.

Table 15 - 8.

Product-moment intercorrelations among intervening and achievement test variables of all Grade II subjects of urban and Rural schools.

VARIABLES	Intervening 1	2	3	4	5	Achievement Tests 6	7	8	9	10
Urban-Male+Female N = 96										
1. Mental Age	.	971**	047	028	-015	347**	425**	237*	417**	4,10**
2. I.Q.		.	088	058	-013	341**	429**	260*	425**	386**
3. Soc. Mat.			.	066	206*	110	095	161	120	093
4. Moral Relat.				.	-012	133	194	160	195	218*
5. Sociom.Ind.					.	103	009	068	041	091
6. Lang Ach.I						.	721**	593**	834**	578**
7. Lang Ach.II							.	592**	971**	591**
8. Lang Ach.III								.	728**	539**
9. Lang Ach.Total									.	641**
10. Maths.Ach.										.
Rural-Male+Female N = 92										
1. Mental Age	.	98[illegible] **	018	-001	089	162	344**	035	300**	-03[illegible]
2. I.Q.		.	-006	-041	063	163	358**	032	306**	-046
3. Soc.Mat.			.	205*	155	109	143	202	159	086
4. Moral Relat.				.	109	205*	194	127	224*	244
5. Sociom.Ind.					.	091	060	034	088	023
6. Lang Ach.I						.	525**	648**	749**	59[illegible]
7. Lang Ach.II							.	473**	935**	49[illegible]
8. Lang Ach.III								.	657**	5[illegible]
9. Lang Ach.Total									.	6[illegible]
10. Maths.Act.										

* P $<$.05; ** P $<$.01.

quite high, and all are positive - but each of the coefficients are slightly lower in value than their counterparts in the urban sample.

So far, we have been concerned with the subjects of Grade I. We can now turn to a consideration of the same inter-correlations for the urban school Grade II subjects and rural school Grade II subjects., which are shown in Table 16-8.

It will at once be seen that the coefficients of correlation, in general, have been further reduced in size, as compared to the corresponding values for Grade I subjects and this is true for both the samples - urban and rural. For the urban boys and girls of Grade II, only 'mental age' and 'IQ' correlate significantly with the dependent (achievement test) variables. However, it is rather interesting that, 'social maturity' correlates positively with all the remaining variables; and the correlation with 'sociometric status index' reaches significance at .05 level. The same is also almost true for moral relativism - only in this case, it correlates negatively with 'sociometric status index'. Lastly, as in the grade I urban school sample, 'sociometric status index' has low positive correlations with all the achievement test variables.

In the rural sample of Grade II subjects, the correlations are in general, further reduced in size., however, with one or two interesting exceptions: (1) 'social maturity' is found to have somewhat higher correlations with 4 of the 7 remaining variables; (2) 'Moral relativism' has somewhat higher correlations with 4 of the 6 remaining variables.

It is also remarkable, that the inter-correlations among the achievement test variables have also dwindled insize in the rural sample.

But what is difficult to explain is that uniformly low or even negative correlation of the 'mathematics

achievement test' with the 4 intervening variables- the lone exception being the correlation with 'moral relativism'. The low negative correlation of 'mathematics achievement' with both 'mental age' and 'IQ' are difficult to explain.

Now, we turn to the similar correlations obtained between the same set of variables from the urban and rural schools Grade V subjects. These correlations are shown in Table 15 - 9.

Some interesting features are present in the two correlation matrices which may be pointed out.

(1) In the urban sample, both 'mental age' and 'IQ' have moderately high positive correlations with the remaining variables, the only exception being - 'social maturity' with which the correlations are low negative. In the rural sample, the corresponding coefficients are generally reduced in size -- though the trend is exactly reversed with 'social maturity', where the correlations now become low positive.

(2) With the next variable, the situation is quite peculiar. In the urban sample, this variable correlates negatively with all achievement variables, (one of them reaching significance at .05 level !); and all other intervening variables (one of them, viz., with 'moral relativism' reaching significance at .05 level), with the exception of one variable, viz., 'sociometric status index' - but even here the correlation is not significantly different from zero.

The situation is somewhat different with this variable in the rural sample. First, we note that all the correlations are low - none of them reaches significance even at .05 level. But, 'social maturity' now correlates positively with 'mental age' 'IQ', 'sociometric status index', language achievement subtest I,II and Total and 'mathematics achievement'. It has low negative correlations only with 'moral relativism' and language subtest III.

Even more interesting are the correlations of 'moral relativism' with other variables. First, in the urban

Table 15 - 9

Product-moment ; inter correlations among Intervening and Achievement variables of all Grade V subjects of urban and Rural schools.

VARIABLES	Intervening					Achievement				
	1	2	3	4	5	6	7	8	9	10
Urban-Male+ Female (N=97)										
1. Mental Age.		976**	-031	275**	180	308**	339**	425**	397**	467**
2. I.Q.		-	-029	269**	200*	324**	323**	398**	389**	440**
3. Soc.Mat.			-	-221*	043	-102	-185	-257*	-198	-156
4. Moral Relat.				-	139	377**	407**	507**	479**	388**
5. Sociom. Ind.					-	115	155	086	130	187
6. Lang Ach.I						-	787**	626**	908**	400**
7. Lang Ach.II							-	712**	917**	500**
8. Lang Ach.III								-	806**	590**
9. Lang Ach.Total									-	549**
10. Maths. Ach.										-
Rural-Male+ Female (N=114)										
1. Mental Age.		987**	030	-049	110	171	193*	222*	223*	254*
2. I.Q.		-	022	-074	101	172	193*	216*	222*	241*
3. Soc. Mat.			-	-071	086	093	153	-077	066	012
4. Moral Relat.				-	095	211*	264**	242**	276**	268**
5. Sociom. Ind.					-	270**	231*	205*	305**	368**
6. Lang Ach.I						-	734**	609**	921**	488**
7. Lang Ach.II							-	529**	864**	507**
8. Lang Ach.III								-	804**	536**
9. Lang Ach.Total									-	583**
10. Maths. Ach.										-

* P < .05; ** P < .01.

sample, with the lone negative correlation with 'social maturity' (significant beyond .05 level), it has positive correlations with all the other remaining variables. Not only that -- the correlation values are large enough for all of them to be significant at better than .01 level. The strength of the correlations in the rural sample, systematically goes down; here 'moral relativism' correlates negatively with 'mental age', 'IQ', and 'social maturity', and positively with the 'sociometric status index' and all the 5 achievement variables, four of which are significant beyond .01 level, and one, beyond .05 level. This is rather an interesting relationship -- "moral relativism" being a function of some of those psychological processes of development which are also functionally related to achievement in school achievement.

A still more interesting finding is with regard to the inter-relation between 'sociometric status index' and remaining variables. All the correlations are positive in sign - in both urban and rural groups. But what is more, the correlation coefficients appear to increase in size as one goes from the urban to the rural sample. In the urban sample only one correlation coefficient (with IQ) is significant beyond .05 level- but in the rural sample, 4 of the coefficients are significant at better than .01 level and one at better than .05 level.

The intercorrelations among the achievement test variables are all uniformly high or moderately high.

So far we have been studying groups of the same age-grade, and of the same location-either urban or rural, but where both the sexes have been put together. What sort of impact the sex factor exercises on the correlations may be studied by considering the same inter-correlations for groups which are homogeneous with respect to sex, but where variability due to location has been retained by combining samples from urban and rural schools together. The correlation between the intervening and achievement variables

Table 15 - 10.

Product-moment inter-correlations among intervening and achievement test variables of only boys and of only girls of Grade I from urban and rural schools pooled together.

VARIABLES:-	Intervening 1	2	3	4	5	Achievement 6	7	8	9	10
Grade I Males N = 127										
1. Mental Age-		971**	268**	110	132	310**	252**	366**	354**	311**
2. I.Q.		.	271**	104	186*	327**	238**	366**	357**	345**
3. Social Mat.			.	195*	038	202*	151	124	169	178*
4. Moral Relat.				.	076	197*	332**	356**	323**	415**
5. Sociom.S.I.					.	160	059	121	133	103
6. Lang Ach.I						.	736**	711**	836**	705**
7. Lang Ach.II							.	839**	908**	724**
8. Lang Ach.III								.	948**	746**
9. Lang Ach.Total									.	792**
10. Maths. Ach.										.
Grade I Female N = 77										
1. Mental Age.		973**	044	348**	-131	392**	278*	282*	327**	394**
2. I.Q.		.	040	396**	-087	397**	284*	300**	339**	414**
3. Social Mat.			.	-108	-150	-119	-141	-146	-142	042
4. Moral Relat.				.	123	215	283*	255*	258*	292**
5. Sociom.Stat.Ind.					.	-081	-024	001	-028	-022
6. Lang Ach.I						.	853**	818**	921**	744**
7. Lang Ach.II							.	941**	967**	737**
8. Lang Ach.III								.	973**	739**
9. Lang Ach.Total									.	770**
10. Maths. Ach.										..

* P ∠ .05; ** P ∠ .01.

for Grade I are shown in Table 15-10.

First, let us note in the male group, that both mental age and IQ have moderately high correlations with the remaining variables. With the exception of 'moral relativism', which correlates non-significantly with both mental age and IQ, and sociometric status index which correlates not significantly with mental age, all the other correlations are significant, most of them beyond .01 level. The situation is similar with the female group - save slight differences: here, 'social maturity' correlates non-significantly with both mental age and IQ. But here 'moral relativism' now correlates significantly (beyond .01 level) with both mental age and IQ. Further, 'sociometric status index' correlates negatively with both mental age and IQ.

The most striking difference occurs with the variable of 'social maturity'. Its correlations with the remaining variables in the male group are all positive, and moderately valued, 2 of them being significant beyond .01 level, and 3 beyond .05 level. In the female group, however, correlation of all variables with 'social maturity', are reduced in size - so that, 6 out of the nine coefficients are now negative, and 3 of them positive. But all are non-significant.

The situation does not change so drastically with the fourth variable - 'moral relativism'. In the male group, it correlates positively with all the remaining variables - four of them reaching significance at .01 level, and two at .05 level. In the female group, one of the correlations is negative (with 'social maturity') and of the remaining 8 correlations 3 are significant at .01 level, and 3 at .05 level. Thus sex does not appear to act differentially at this age-group for the variables under consideration.

The situation with the 5th. variable, 'sociometric status index' is quite different, and is similar to

that with 'social maturity'. The correlation of this variable with the remaining ones are all positive, in the male group, but none reaches significance even at .05 level. But, in the female group, all the correlations, save two (with moral relativism, and language achievement - IIIrd sub-test), -- the remaining seven are low negative.

Inter-correlations, among the achievement tests are uniformly high for both the groups.

Let us now consider the correlation between the intervening and achievement test variables for groups of male and female subjects separately for Grade II, of both urban and rural schools. These correlation coefficients are shown in Table 15-11.

The picture is not substantially different from that with the Grade I groups.

We note that both 'mental age' and 'IQ' have tended to have positive correlations with the other variables, the only exception being two correlations with 'moral achievement', and two correlations with 'sociometric status index' in the male group of Grade II, where these are low negative. Mental age has three correlations which are significant beyond .01 level in the male group, and four correlations which are significant beyond .01 level in the female group, in addition to one correlation which is significant beyond .05 level. The situation improves still further with IQ: it has, just like 'mental age', three correlations which are significant beyond .01 level in the male group; likewise in the female group, it has now four correlations which are significant beyond .01 level, and two more correlations which are significant at better than .05 level. In fact in the female group, there are no negative correlations of any x variable with intelligence quotient.

'Social maturity' as in Grade I, again appears to behave very erratically. It has low positive correlations with all the remaining variables in the male group of Grade

Grade II - 3 of which reach significance at .05 level. But in the female group there is some reduction in some of the correlation values, and some increase in some other correlation values - with variables belonging to the intervening variables - but its correlation with the achievement variables are so reduced uniformly, that not only none is significant even at .05 value, and 3 of them are negative. Surprizingly, 'social maturity' correlates .274 with 'moral relativism' in the female group, which is significant at better than .05 level.

The situation with the next variable 'moral relativism' is also no less interesting. It correlates low with all remaining variables in the male group: 3 of them are negative, and 6 positive - but no one reaches significance even at .05 level. But the position is reversed in the female group. Here, not only 'moral relativism' has positive correlations with all the remaining variables -- but some of them are quite large, so much so, that one of them (with 'mathematics achievement') is significant beyond .01 level (r= .532), and 4 other correlations are significant beyond .05 level. This trend is replicated with the next variable 'sociometric status index'. Its correlation with other variables of the male group is uniformly low -- 6 of them being negative, and 3 of them being positive. But the same variable in the female group, correlates positively with all the remaining variables, two of which being significant beyond .05 level(with IQ, and 'social maturity').

It may also be noted that the intercorrelations among the achievement variables in both the groups are in general somewhat lower than those in the corresponding groups in Grade I.

Now, we can consider the correlations among the same sets of variables in the male and female groups of Grade V, drawn from both urban and rural schools. These correlations are shown in Table 15-12.

Table 15 - 11.

Product-moment inter-correlations among Intervening and Achievement test variables of only boys and of only girls of Grade II from urban and rural schools pooled together.

VARIABLES	Intervening 1	2	3	4	5	Achievement 6	7	8	9	10
Grade II Male N=123										
1. Mental Age	.	970**	056	-043	-051	258**	371**	038	329**	174
2. I.Q.		.	063	-043	-076	252**	373**	038	327**	184*
3. Soc. Mat.			.	034	112	181*	154	192*	177	124
4. Moral Relati				.	-027	033	090	048	082	012
5. Sociom. S.I.					.	040	-104	-085	-072	055
6. Lang Ach.I						.	676**	647**	826**	655**
7. Lang Ach.II							.	538**	955**	576**
8. Lang Ach.III								.	696**	558**
9. Lang Ach.Total									.	657**
10. Maths. Ach.										.
Grade II Females N=65										
1. Mental Age	.	990**	066	196	243	315*	430**	444**	465**	322**
2. I.Q.		.	100	193	251*	294*	427**	435**	456**	399**
3. Social Mat.			.	208	274*	-026	-036	118	-010	020
4. Moral Relat.				.	096	297*	281*	250*	318*	532**
5. Sociom. State I.					.	133	166	224	192	021
6. Lang Ach.I						.	576**	535**	745**	460**
7. Lang Ach.II							.	548**	963**	488**
8. Lang Ach.III								.	698**	522**
9. Lang Ach.Total									.	554**
10. Maths. Ach.										.

* P ≤ .05; ** P ≤ .01.

Table 15 - 12

Product-moment inter-correlations among intervening and achievement test variables of only boys and of only girls of Grade V from urban and rural Schools pooled together.

VARIABLES	Intervening 1	2	3	4	5	Achievement 6	7	8	9	10
Grade V.Males N = 148										
1. Mental Age	.	979**	066	029	137	187*	232**	303**	264**	318**
2. I.Q.		.	048	010	142	204*	220**	291**	263**	289**
3. Social Mat.			.	-214	020	-068	-102	-171	-124	-054
4. Moral Relat.				.	120	270**	305**	372**	349**	292**
5. Sociom.State Ind.					.	173*	152*	180*	193*	243**
6. Lang Ach.I						.	781**	685**	923**	420**
7. Lang Ach.II							.	701**	907**	489**
8. Lang Ach.III								.	874**	552**
9. Lang Ach.Total									.	531**
10. Maths.Ach.										.
Grade V Females N = 63										
1. Mental Age	.	958**	-180	285*	158	273*	293*	390**	392**	397**
2. I.Q.		.	-155	260*	156	236	274*	340**	347**	381**
3. Social Mat.			.	-080	162	068	132	-236	-025	-170
4. Moral Relat.				.	126	385**	468**	515**	556**	420**
5. Sociom.State Ind.					.	233	303*	149	274*	396**
6. Lang Ach.I						.	655**	424**	866**	491**
7. Lang Ach.II							.	408**	813**	529**
8. Lang Ach.III								.	761**	597**
9. Lang Ach.Total									.	661**
10. Maths.Ach.										.

* P $<$ .05; ** P $<$ .01.

The trend of correlations with mental age intelligence quotient, in both the male and female groups, of Grade V, is similar to that seen in Grade I and Grade II. In fact, here also we find that the correlations seem to increase somewhat in the female group compared to the male group, so far as these two variables - mental age, and IQ - are concerned. Mental age has 3 correlations reaching significance beyond .01 level, and one beyond .05 level in the male group: but in the female group, mental age has 3 correlations reaching significance beyond .01 level, 3 additional correlations significant beyond .05 level- but strangely enough, one of the correlations - with 'social maturity' is now negative ! The position with correlations with IQ is very similar: it has 4 correlations significant beyond .01 level and one beyond .05 level, in the male group; it has 3 correlations significant beyond .01 level, ~~and one~~ correlation significant beyond .05 level, in the female group; here too, one of the correlations (with 'social maturity') is negative.

The variable 'social maturity' is more consistent in its behaviour, in both male and female groups. It has 6 of the nine correlations in the male group negative -- 2 of them significant beyond .05 level (with 'moral relativism' and x language achievement - subtest III). In the female group the situation is identical -- six of the correlations are negative -- but no one correlation reaches significance even at .05 level.

'Moral relativism' - the next variable, appears to improve its position still further in this grade. Only one of its correlation (with social maturity) is negative, significant at .05 level in the male group - the remaining seven are all positive, and 5 of them - all with the achievement tests -- are significant beyond .01 level. The correlation with mental age and IQ increase sufficiently to reach significant at .05 level.

This trend of improvement- in terms of increase in the number and size of positive correlations is maintained by the la intervening variable, 'sociometric status index'. The variable correlates positively with all the remaining variables, both in the male and female groups. In the male group, 4 of the 9 correlations- all with achievement tests- are significant at better than .05 level and one is significant at better than .01 level. In the female group one (with mathematics achievement) is significant at better than .01 level, and two are significant at better than .05 level.

The inter-correlations among the achievement variables are usually high in the male group, and somewhat less so in the female group.

It may be worthwhile to attempt to summarize the mass of findings - with regard to the disposition of the correlation of each of the 5 intervening variables among themselves, and with the achievement variables - specially to see if there is any systematic trend from group to group - age-grade-wise, and sex-wise The number of correlation coefficients which are positive and significant at least at .05 level and beyond, that each of the five intervening variables has with remaining variables, in different groups, has been shown in tabular form in Table 15-13.

Table 15 - 13.

Number of significant positive correlations that each of the 5 intervening variables has with other intervening and achievement variables in different samples homogeneous with regard to age-grade and sex.

Variable	Male Grade I	Male Grade II	Male Grade V.	Total (out of 27)	Female Grade I	Female Grade II	Female Grade V	Total (out of 27)	Male+Female Total (out of 54)
1. Mental Age	7	4	6	17	7	6	6	19	36
2. I.Q.	8	4	6	18	7	7	6	20	38
3. Social Maturity	5	3	2	10	0	1	0	1	11
4. Moral Relativism	6	0	5	11	6	5	7	18	29
5. Sociometric Status index	1	0	5	6	0	2	3	5	11
Total	27	11	24	62	20	21	22	63	125

The above table neatly summarises a few interesting things:-

(1) Overall difference in the disposition of correlations between the two sex groups is rather similar save for one variable - and that is, social maturity; it has 10 significant correlations in the 3 male groups, but it has only one significant correlation in the female group.

(2) Overall difference in the disposition of correlations from grade to grade, for both male and female groups is also not at all marked: only grade II male shows some discrepancy from the rest. For each grade, out of 45 correlations, from 20 to 27 correlations are found to be significant, save for Grade II male, where the number of significant correlations is only 11.

(3) Variablewise, after mental age and IQ., moral relativism is the only variable which has moderate number of significant correlations with other variables.

(4) Sociometric Status Index has very few significant correlations, among both sex groups - but it does show an upward trend in the higher age-grade group.

(5) Social maturity on the other hand seems to be related to sex - it has 10 significant correlations with other variables in the male group, but only one significant correlation in the female group.

So far, we have been looking into the correlations for groups which are homogenous with regard to sex, and to age-grade, but heterogenous with respect to location of schools. We can see if further stability can be effected by looking into the correlations which are heterogenous, with respect to sex and location of schools. The correlations between the same set of variables for all the three age-grade groups, with both the sexes and types of location thrown together are shown in Table 15-14.

The overall trends in the dispotion of the correlations, in the fairly large and heterogenous groups with regard to sex and location of schools can be summarized thus:

(1) In the youngest group of Grade I, both mental age and IQ have positive correlations with all the remaining variables. With the exception of 'Sociometric status index' all the other variables correlate at better than .01 level of significance with both mental age and IQ.

Table 15 - 14.

Product-moment inter-correlations among Intervening and Achievement-test variables for each of the three grades for all subjects of urban and rural schools pooled together.

Variable	1	2	3	4	5	6	7	8	9	10
	Intervening					Achievement				
Grade I M+F, R+U- N=204										
1. Mental Age		973**	218**	190**	054	319**	231**	293**	309**	326**
2. I.Q.			220**	202**	104	330**	222**	297**	313**	353**
3. Social Maturity				069	-024	053	-003	-031	003	110
4. Moral Relat.					092	203**	310**	310**	294**	367**
5. Sociom.Index						076	026	071	070	059
6. Lang Ach.I							782**	752**	898**	720**
7. Lang Ach.II								884**	934**	728**
8. Lang Ach.III									959**	739**
9. Lang Ach.Total										780**
10. Maths. Ach.										
Grade II M+F, R+U N=188										
1. Mental Age		975*	061	014	042	257**	366**	152*	347**	207**
2. I.Q.			080	011	034	046**	357**	155	344*	175*
3. Social Maturity				101	184*	083	061	152*	085	072
4. Moral Relat.					045	163*	194*	149	206**	229**
5. Sociom. Ind.						091	022	048	051	053
6. Lang Ach.I							646**	613**	800**	589**
7. Lang Ach.II								550**	959**	550**
8. Lang Ach.III									703**	552**
9. Lang Ach.Total										626**
10. Maths.Ach.										
Grade V M+F, R+U, N=211										
1. Mental Age		981**	-002	130	147*	241**	268**	331**	314**	354**
2. I.Q.			-004	111	151*	245**	256**	309**	304**	331**
3. Sociom Index				-160*	061	-002	-026	-183**	-081	-073
4. Moral Relat.					125	311**	352**	414**	404**	335**
5. Sociom. Index						192**	194**	175*	213	279**
6. Lang Ach.I							764**	621**	914**	452**
7. Lang Ach.II								635**	893**	509**
8. Lang Ach.III									842**	564**
9. Lang Ach.Total										569**
10. Maths.Ach.										

* P <.05; ** P <.01.

<u>This is an important finding</u>, In grade II, the correlation values tend to be somewhat reduced, so that, now, 'social maturity', 'moral relativism' and 'sociometric status index' all correlate so low with both mental age and IQ, that they are no longer statistically significant. Correlation of both mental age and IQ with achievement test variables are significant beyond .01 level, save with language achievement subtest III, which are significant at .05 level.

This trend is more or less repeated in Grade V, with some improvement as well as deterioration. Here 'social maturity' has very low negative correlations with mental age and IQ; but correlations with both 'moral relativism' and 'sociometric Status index' improves appreciably, so much so that, with the latter variable, they reach significant at better than .05 level.

These changes appear to be quite age-specific. Correlation of both mental age and IQ with all the achievement variables also improve somewhat, so that all of them are now significant beyond .01 level.

(2) The next variable, 'social maturity' we may recall had behaved erratically in smaller, homogenous groups. Here, in the larger heterogenous groups, a clear-cut trend comes to the surface. In the lowermost age-grade group, 'social maturity' correlates positively (and significantly at .05 level) with both mental age and IQ, but its correlations with the remaining variables are either low positive or low negative - 3 negatives, and 4 positives. In the next age-grade group, the correlations of this variable with both mental age and IQ are reduced to the level of statistical non-significance, but its correlation with some of the remaining variables improve somewhat - so that its correlation with 'moral relativism' and language Subtest III now reach significance at .05 level. None of its correlations are now negative. But in Grade V, this trend is altogether reversed: out of the nine correlations, 8 are negative - one, with

'language achievement subtest III being significant beyond .01 level. Only one correlation, with sociometric status index, is positive.

(3) The next variable is 'moral relativism'. In Grade-I, it correlates positively at better than .01 level with both mental age and IQ, as well as with all the 5 achievement variables. Its correlations with the remaining two intervening variables, viz. 'social maturity' and 'sociometric index' are low positive.

In Grade II, all the correlations of 'moral relativism' with the remaining variables are positive, but most of them are reduced in size, so that only two, with 'language achievement - total' and 'mathematics achievement' are now significant at .01 level, and 2 more are significant at better than .05 level - the remaining fail to reach level of statistical significance.

The situation is considerably improved, though somewhat unsystematically in the hightest age-grade group. Now 'moral relativism' has all the five correlations with the achievement variables high enough to be significant beyond .01 level. Its correlations with 'mental age', IQ, and 'sociometric status index' are all positive, but do not reach level of statistical significance. Further its correlation with 'social maturity' is not only negative, but significant at .05 level.

(4) The last variable is 'sociometric status index'. This also exhibits some systematic variation from the lower to the higher age-grade groups. In Grade I, this variable has low positive correlations, with all the remaining variables except one, viz., 'social maturity' with which the correlation is low negative. All the correlations fail to reach level of statistical significance. In Grade II, the situation shows some improvement - all of the 9 correlations are now positive, and one of them, rather strangely, with 'social maturity' is now large enough to be significant at better

than .05 level. In Grade V this improvement is maintained very remarkably. Now, all the nine correlations are positive; 2 of these correlations, with 'mental age' and 'IQ' are now significant at better than .05 level; further, all its 5 correlations with the achievement variables are now significant beyond .01 level.

This, undoubtedly, is a finding of considerable interest - this, consistent and systematic increase in the value of the correlation that 'sociometric status index' has with all the remaining variables, as we go from very young age-grade group to a fairly mature age-grade group.

All these trends now can be summarized by making a comparison between the number of significant positive correlations that each of the five intervening variables has with the remaining intervening and achievement variables, as one goes from the lowest-age-grade group to the highest age-grade group- the groups being large and heterogenous with respect to both sex and location of schools. These numbers are summarized in Table 15-15.

Table 15 - 15

Number of significant positive correlations that each of the five intervening variables has with the remaining intervening and achievement variables for all the subjects of the thre age-grade groups.

Variable	Grade I N=204	Grade II N=188	Grade V N=211	Total (Out of 27)
1. Mental age	8	6	7	21
2. IQ	8	6	7	21
3. Social Mat.	2	2	0	4
4. Moral Relat.	7	4	5	16
5. Sociom. Stat. Ind.	0	1	7	8
Total(out of 45)	25	19	26	70

The more remarkable facts shown in Table 15-15 can be underlined thus:

(1) Both mental age and IQ have the same number of positive and significant correlations with remaining variables.

(2) Next comes 'moral relativism', followed by 'sociometric status index'.

(3) Correl tion with sociometric status index of other variables seems to depend upon the stage of psychological development of the subjects: in Grade I none of the correlations of this variable with the remaining variables reach significance; in Grade II only one correlation coefficient reaches statistical significance; but in Grade V, no less than 7 correlations (out of a possible of 9) are significant.

(4) Correlations of 'social maturity' with the remaining variables always tend to be low - in all groups.

It will be seen that we have now three consistent findings:

(1) Moral relativism is a variable which usually has positive correlation with remaining variables - some of which reach level of statistical significance.

(2) Sociometric status index has may psotive correlation with the remaining variables in the more mature age-grade group.

(3) Social maturity, by and large, do not correlate significantly with remaining variables.

Differential Impact of Location, Sex and Grade

Some of the fluctuations in the correlation values, due to sampling factors are undoubtedly stabilized by taking larger samples - but this is done at the cost of introducing heterogeneity - in terms of (i) locations of schools - urban or rural; (ii) sex - male or female; and (iii) age-grade - Grade I, Grade II and Grade V. How these fundamental heterogeneities influence the correlations among the intervening and achievement test variables can be teased out, at least qualitatively, by introducing the heterogeneity systematically - that is, in a controlled fashion.

(a) Age - Grade Factor : Age-grade is a fundamental, physical, tangible reality, introducing variability

or more correctly, increasing the total range of scores in each of the variables. How the sex and location factors interact, over the entire range of spread of age-grade from Grade I (minimum age 5½ years) to Grade V (maximum age - 11 years), can be studied, for the inter-reactions between the 5 intervening variables only - because tests correlations among the 5 intervening variables for all subjects of the same sex and schools of same location, are shown in Table 15 - 16.

First, let us note the highly significant correlation between 'mental age' and 'IQ' - whose values now range from 819 to 856 - which is to be expected on theoretical and mathematical grounds. However, what is noteworthy even here is the value of .856 for both males and females of the urban schools, as compared to .819 and .923, for the males and females of the rural schools.

Next, we note that, there are 4 correlations significant beyond .01 level, and one correlation significant beyond .05 level, for the male, urban group, among the 9 correlations reported. In the female, urban group, some of the correlations are larger in value, but because of the smaller sample size, some fail to reach significance at even .05 level, so that we have now 3 correlations significant at .01 level, and one at .05 level, in this group.

When we turn to the correlations for the male sample of the rural schools, we see that, the correlations have tended to have been reduced in size, so that now there are only 2 correlations significant at .01 level and one at .05 level. The situation further worsens in the female sample of rural schools - now there are only two correlations which are significant at .05 level. What is more remarkable in this last group, is that both mental age and IQ, as well as 'moral relativism' correlate negatively with social maturity.

If we scan these tables, variable by variable, we may find some interesting trend, which has been shown

Table 15-16

Product-moment inter-correlations among the Intervening variables for subjects of the same sex of all the three grades together, for urban schools, and for rural schools.

Intervening Variables	Intervening variables 1	2	3	4	5
Male, Grades I+II+V, Urban	N=188				
1. Mental Age		856^{xx}	125	329^{xx}	189^{xx}
2. Intelligence Quotient			169^{x}	217^{xx}	122
3. Social Maturity				022	099
4. Moral Relativism					193^{xx}
5. Sociometric Status Index					
Female, Grades I+II+V, Urban	N=113				
1. Mental Age		856^{xx}	171	468^{xx}	256^{xx}
2. Intelligence Quotient			082	446^{xx}	223^{x}
3. Social Maturity				116	165
4. Moral Relativism					121
5. Sociometric Status Index					
Male, Grades, I+II+V, Rural	N=210				
1. Mental Age		819^{xx}	099	294^{xx}	241^{xx}
2. Intelligence Quotient			051	003	165^{x}
3. Social Maturity				044	015
4. Moral Relativism					121
5. Sociometric Status Index					
Female, Grades I+II+V, Rural	N= 92				
1. Mental Age		823^{xx}	-155	222^{xx}	135^{xx}
2. Intelligence Quotient			-097	115	067
3. Social Maturity				-026	109
4. Moral Relativism					208^{x}
5. Sociometric Status Index					

x P < .05; xx P < .01

in Table 15 - 17.

Table 15 - 17.

Number of significant correlations each of the 5 intervening variables has with remaining variables, in 4 different samples homogeneous with respect to sex and location.

Variable	Groups Male, urban N=180	Female Urban N=113	Male Rural N=210	Female, Rural N=92	Total out of 16.
1. Mental Age	3	3	3	2	11
2. IQ	3	3	2	1	9
3. Social Mat.	1	0	0	0	01
4. Moral Relativism	2	2	1	1	6
5. Sociom. Stat. Index	2	2	2	1	[illegible]
Total (out of 20)	11	10	8	5	34

This table, in a nutshell, points to three interesting trends:

(1) Mental age, and IQ, understudbly, have the highest number of significant correlations, followed by sociometric status index and moral relativism; social maturity coming last.

(2) The total number of correlations which systematically decreases from male, urban to female, rural, is much higher in the urban sample than in the rural sample.

(3) It goes down very much in the rural, female sample.

It is quite clear that 'social maturity' is one variable which does not behave in the same manner as the remaining 4 variables under consideration.

In the above analysis, the group size has been increased by taking subjects of all the three age-grades together, which retained their homogeneity with regard to sex and location of schools. The groups can be made still larger, and thereby enlarge the range of socres, by taking subjects of all the three grades of schools of both locations, one belonging to both the sexes. And lastly, we can also

look into the correlations among the five intervening variabl for the entire sample, consisting of subjects of all the thre grades, and both sexes, from schools of both the locations. These three tables of correlations are shown in Table 15-18.

Table 15 - 18.

Product-moment correlations among Intervening variables for the entire urban and rural sample; separately and together.

Intervening variables	Mental Age	IQ	Soc.Mat.	Moral Relat.	Sociom. S.I.
	1	2	3	4	5
Urban Sample, M+F, Grades I+II+V, N=301					
1. Mental Age	-	858xx	150xx	374xx	208xx
2. IQ		-	143x	295xx	152xx
3. Social Maturity			-	059	120x
4. Moral Relativism				-	170xx
5. Sociometric Status Index					-
Rural Sample, M+F, Grades I+II+V. N=302					
1. Mental Age	-	828xx	048	271xx	210xx
2. IQ		-	038	039	136xx
3. Social Maturity			-	021	049
4. Moral Relativism				-	147x
5. Sociometric Status Index					-
Urban+Rural, M+F Grades I+II+V, N=603					
1. Mental Age	-	845xx	119xx	319xx	207xx
2. IQ		-	111xx	172xx	143xx
3. Social Maturity			-	027	086x
4. Moral Relativism				-	161xx
5. Sociometric Status Index					-

x P $\angle$.05; xx P $\angle$.01

Let us look at the urban sample correlations first. Here we find that all the correlations except one are significant at .05 level or even .01 level with the exception of first one. This is the correlation between 'social maturity' and 'moral relativism'.

In the rural sample, these correlations are generally reduced, so that no less than 5 out of the 10 correlations now fail to reach statistical significance at

even .05 level.

However, when the entire sample is considered, the situation again improves and further, there is just only one correlation which fails to reach statistical significance even at .05 level. This is the correlation between 'social maturity' and 'moral relativism'.

The most striking feature of these three correlation matrices is that all correlations are now positive. This finding is in tune with most psychological traits which tend to be positively correlated, when a sufficiently large sample is considered.

II <u>Inter-correlations among the Mosaic Test Variables.</u>

We have seen in an earlier chapter while considering the mean values for the scores for the eight different variables measuring certain objective and certain subjective features of the mosaic designs created by the subjects, a systematic variation which is a function of the age or development of the subjects; on the other hand, difference between boys and girls, within the same age-grade group, or between groups of subjects one belonging to urban schools and another to rural schools, is not great. In order to see whether such a systematic trend is also shown in the correlations between variables, the correlations for three grades may be considered together.

The coefficient of correlations between the eight mosaic test variables for male subjects of the urban schools are shown in Table 15 - 19.

The first variable, 'time taken to complete the mosaic design', has positive correlations with "total number of pieces" and "area covered" - in all the three grades; all the correlations are moderately high, and significant at betterthan .01 level. Its correlations with all other variables are either, low positive or low negative.

The next variable, 'total number of pieces', correlate positively with 'time taken', and 'area covered';

Table 15 - 19.

Product-moment inter-correlations among Mosaic Test variables for male subjects of three grades of the Urban schools

Variables	Mosaic Test Variables: Objective features 1	2	3	4	Subjective features 5	6	7	8
Grade I-Males N=66								
1. Time taken		486^{xx}	-154	507^{xx}	-015	183	-062	060
2. Total No. of pieces			-042	196	-045	-135	-323^{xx}	-141
3. No. of subdesigns				-056	-160	-124	-018	-178
4. Area covered					-029	-084	-327^{xx}	-110
5. Rating - Scale I						784^{xx}	681^{xx}	922^{xx}
6. Rating - Scale II							711^{xx}	933^{xx}
7. Rating - Scale III								809^{xx}
8. Rating - Scale Total								-
Grade II-Males, N=57								
1. Time Taken		823^{xx}	096	721^{xx}	120	052	-168	041
2. Total No. of pieces			-014	893^{xx}	192	140	-235	109
3. No. of subdesigns				-043	-167	-080	027	-113
4. Area covered					053	040	-286	-009
5. Rating - Scale I						840^{xx}	572^{xx}	931^{xx}
6. Rating - Scale II							677^{xx}	964^{xx}
7. Rating - scale III								753^{xx}
8. Rating - Scale Total								-
Grade V - Male N= 65								
1. Time taken		624^{xx}	071	597^{xx}	-055	-010	-168	-035
2. Total No. of pieces			342^{xx}	916^{xx}	103	128	-143	110
3. No. of subdesigns				355^{xx}	030	128	004	087
4. Area covered					115	170	-087	154
5. Rating - Scale I						870^{xx}	620^{xx}	919^{xx}
6. Rating - Scale II							632^{xx}	920^{xx}
7. Rating - Scale III								711^{xx}
8. Rating - Scale Total								-

^{x} P ∠.05; ^{xx} P ∠.01.

the correlations values are quite high, and of course significant beyond .01 level. Its correlation with the other variables are either low positive or negative.

The third variable 'number of sub-designs' have low positive or negative correlations with the first two variables already discussed - viz., 'time taken' and 'total number of pieces' in the three Grades, but it becomes high enough to x reach significant at .01 level in Grade V. But its correlation with 'area covered' is low negative in Grade I and Grade II, and it becomes positive, and of a moderate value to be significant beyond .01 level in Grade V.

The last variable under the category of objective variables, viz, 'area covered', correlates positively with 'time taken' and 'total number of pieces' in all the three grades - the correlation values being quite high. But it correlates negatively with 'number of subdesigns' in Grade I and II, but the same correlation becomes positive and significant at .01 level in Grade V.

The inter-correlations among the four subjective variables, are all substantial and positive, in all the three grades. The high correlation of each of the three subjective rating scales with the fourth, which is the total, undoubtedly is partly at least due to the self correlation - because the same test score is a part of the sum of the total score obtained by summing the three rating scores.

It is also noteworthy that the correlation between the objective variables on one hand and the subjective variables on the other, are all low, and are both positive and negative - in all the three grades. However, the number of positive correlation appears to increase as we go from Grade I through Grade II to Grade V. Thus whereas in Grade I, 14 out of 16 correlations are negative, in Grade only 7 are negative, and in Grade V the number of negative correlations becomes 6. This seems to be a systematic developmental trend.

So far about the three grades of male subjects in

urban schools. Let us now consider the correlations obtained from the three grades of female subjects in urban schools. These are shown in Table 15-20.

It will be seen, that the overall trends of the correlations in the girls samples in the urban schools are similar to those in the boys' samples in the urban schools. In Grade I females; the first variable 'time taken' correlates appreciably with 'total number of pieces'; 'time taken', and 'number of sub-designs' - the last one is not significant, but the first x two correlations are significant beyond .01 level.

In Grade II, the same pattern is repeated, with one exception - the correlation with 'number of subdesigns' is now low negative, but the other correlations are larger. In Grade V, all the three correlations are now significant - the correlation with 'number of subdesigns' at .05 level, and the other two are significant beyond .01 level. The next variable, 'total number of pieces' is correlated positive with 'time taken' in Grade I, II and V. It correlates negatively with 'number of subdesigns' in Grade II, but correlates positively in Grade I and V. Of course 'total number of pieces' has high positive correlation with 'area covered' in all the three grades.

The last variable 'area covered' has high positive correlations with 'time taken' and 'total number of pieces' in all the three grades. However, it has low negative correlation with 'number of subdesigns' in Grade I and II, but a low positive correlation in Grade V. This tendency for correltions to tend to become positive, as one goes for Grade I through Grade II to Grade V has been seen with male samples of the urban schools also.

Next, let us note again that the inter-correlations among the 4 subjective variables (ie. rating scales scores), are all positive, and generally high, in all three grades. However, the magnitude of the correlations tends

Table 15 - 20

Product-moment inter-correlations among Mosaic Test variables for female subjects of three grades of the Urban Schools.

Variables		Mosaic Test Variables						
		Objective features			Subjective features			
	1	2	3	4	5	6	7	8
Grade I-Female, N=42								
1. Time taken		594^{xx}	268	442^{xx}	156	-131	-212	-164
2. Total No. of pieces			-021	839^{xx}	-115	-074	-311^{x}	-141
3. No. of subdesigns				-041	-052	-116	-014	-078
4. Area covered					-139	-129	-269	-168
5. Rating - Scale						898^{xx}	782^{xx}	964^{xx}
6. Rating - Scale II							769^{xx}	970^{xx}
7. Rating - Scale III								862^{xx}
8. Rating - Scale Total								-
Grade II-Female, N = 39								
1. Time Taken		613^{xx}	-027	599^{xx}	-050	-020	-182	-061
2. Total No. of pieces			-096	918^{xx}	033	-110	-305	-088
3. No. of subdesigns				-082	-240	-149	-203	-209
4. Area covered					-003	-057	-261	-071
5. Rating - Scale I						844^{xx}	624^{xx}	941^{xx}
6. Rating - Scale II							718^{xx}	965^{xx}
7. Rating - Scale III								779^{xx}
8. Rating - Scale Total								-
Grade V - Male, N=32								
1. Time taken		579^{xx}	394^{x}	668^{xx}	326	264	012	285
2. Total No. of Pieces			328	846^{xx}	229	125	-131	140
3. No. of subdesigns				332	310	235	-018	266
4. Area covered					301	133	-182	163
5. Rating - Scale I						680^{xx}	317	852^{xx}
6. Rating - Scale II							507^{xx}	945^{xx}
7. Rating - Scale III								606^{xx}
8. Rating - Scale Total								

x P $<$ .05; xx P $<$ .01

to go down slightly in Grade V, as compared to Grade I or Grade II. This trend is just opposite to the pattern of intercorrelations with the objective variables.

If we turn to the correlations between the objective variables on one hand, and the subjective variables, we find the same trend as was found with the male subjects. In general, these correlations are negative, but as we go from Grade I through Grade II to Grade V, the number of negative correlations becomes less, and number of positive correlations tends to increase. For example all the sixteen inter-correlations in Grade I are negative; in Grade II, out of 16 inter-correlations, 15 are negative; but in Grade V, the number of negative correlations goes down to only 3.

So far we have been confining our attention to correlations between scores obtained by male and female groups of urban schools only. Let us now consider the correlations from the same types of groups of rural schools.

The inter-correlations among the 8 mosaic test variables from the males students of the three grades from the rural schools are shown in Table 15 - 21. It will at once be seen that the trends in the patternings of the inter-correlation values is similar to that seen for urban schools - with one difference : most of the correlations have been reduced in size. 'Time taken', 'total number of pieces' and 'area covered' tend to be positively correlated, and the correlation values tend to go up as we go from Grade I through Grade II to Grade V. Even the variable 'number of subdesign' which correlates negatively with all the remaining objective variables in Grade I (boys), become positive in Grade II; in Grade V, two are positive in Grade II; in Grade V, two are positive and one negative. As before, the inter-correlations between the 4 rating scale variables are all positive and high, in all the three grades.

The inter-correlations between the four objective-feature variables on one hand, and the four

Table 15 - 21

Product-moment inter-correlations among Mosaic Test variables for male subjects of three grades of the Rural Schools.

Variables	Mosaic Test Variables						
	Objective features			Subjective features			
	1	3	4	5	6	7	8
Grade I-Female N = 61							
1. Time taken	404^{xx}	-020	212	093	071	-067	054
2. Total no. of pieces		-058^{xx}	805	-131	-178	-340^{xx}	-213
3. No. of subdesigns			-042	-113	-081	123	-054
4. Area covered				-146	-201	-229	-203
5. Rating - Scale I					840^{xx}	672^{xx}	942^{xx}
6. Rating - Scale II						679^{xx}	950^{xx}
7. Rating - Scale III							812^{xx}
8. Rating - Scale Total							-
Grade II-Female N= 66							
1. Time Taken	401^{xx}	236	373^{xx}	011	101	093	084
2. Total No. of pieces		417^{xx}	828^{xx}	037	004	-139	-007
3. No. of subdesigns			416^{xx}	-182	-040	-070	-121
4. Area covered				-183	-107	-279^{x}	-189
5. Rating - Scale I					749^{xx}	644^{xx}	908^{xx}
6. Rating - Scale II						710^{xx}	924^{xx}
7. Rating - Scale III							780^{xx}
8. Rating - Scale Total							-
Grade V - Male N = 83							
1. Time taken	477^{xx}	-077	404^{xx}	-246^{x}	-139	-338^{xx}	-237^{x}
2. Total No. of Pieces		440^{xx}	869^{xx}	-003	-090	-417^{xx}	-141
3. No. of subdesigns			862^{xx}	116	132	-035	102
4. Area covered				-019	-188	-508^{xx}	-218^{x}
5. Rating - Scale I					733^{xx}	576^{xx}	884^{xx}
6. Rating - Scale II						714^{xx}	949^{xx}
7. Rating - Scale III							799^{xx}
8. Rating - Scale Total							-

x $p < .05$; xx $p < .01$.

subjective-feature variables on the other, show the same trend, as was shown by the groups in the rural schools, from grade to grade. In Grade I, out of 16 correlations, 2 are only positive; in Grade II, the number of positive correlations increases to 6 out of 16; in grade V, the number of such positive correlations is 3.

Let us now consider the correlations between the mosaic test variables, for the girls of three grades in the rural schools. These correlations are shown in Table 15 - 21.

Here the trends are replicated quite faithfully. 'Time taken' has positive correltions with all the three remaining subjective-feature variables, in Grade I, and also in Grade II, but in Grade V, it correlates negatively only with 'number of sub-designs used'. The same remarks apply to the correlations of 'total number of pieces used', with the remaining three variables. The correlation with 'number of subdesigns' with the other three variables is rather erratic - all three correlations in Grade I are positive, only one is positive in Grade II and 2 are positive in Grade V. 'Area covered' is found to be positively correlated with the remaining three objective-feature variables in both Grades I and V, but in Grade II, it is correlated negatively with 'number of subdesigns'.

As before, all the inter-correlations between the 4 rating scale variables are positive and high in all the three grades.

The trend shown with regard to the inter-correlation between 4 objective variables and the four subjective variables in the urban schools, males and females are faithfully reproduced in the rural school, male groups also. Most of these correlations are low negative - some of these correlations, though negative, have moderate and statistically significant values. The number of correlations which are positive in Grade I is only one; it rises to 4 in Grade II; it is 3 in Grade V.

Table 15 - 22.

Product-moment inter-correlations among Mosaic Test variables for female subjects of three grades of the Rural Schools.

Variables	Mosaic Test Variables.							
	Objective features				Subjective features			
	1	2	3	4	5	6	7	8
Grade I-Female, N= 35								
1. Time taken		296	228	414^{x}	-286	-225	-807	-284
2. Total No. of pieces			195	932^{x}	-139	-254	-490^{xx}	-279
3. No. of subdesigns				282	-053	080	-194	-024
4. Area covered					-246	-293	-515^{xx}	-345^{x}
5. Rating - Scale I						820^{xx}	686^{xx}	924^{xx}
6. Rating - Scale II							796^{xx}	964^{xx}
7. Rating - Scale III								859^{xx}
8. Rating - Scale Total								-
Grade II-Female, N = 26								
1. Time Taken		421^{x}	101	436^{x}	-200	128	-357	-221
2. Total No. of pieces			-098	969^{x}	-186	-053	-114	-129
3. No. of subdesigns				-068	-013	128	440^{x}	149
4. Area covered					-172	-074	-104	-131
5. Rating - Scale I						801^{xx}	490^{x}	916^{xx}
6. Rating - Scale II							606^{xx}	952^{xx}
7. Rating - Scale III								713^{xx}
8. Rating - Scale Total								-
Grade V-Female N=31								
1. Time Taken		477^{xx}	-077	404^{x}	-246	-139	-338	-237
2. Total No. of pieces			440^{x}	869^{xx}	-003	-90	-417^{x}	-141
3. No. of subdesigns				462^{xx}	116	132	-035	102
4. Area covered					-019	-188	-508^{xx}	-218
5. Rating - Scale I						733^{xx}	576^{xx}	884^{xx}
6. Rating - Scale II							714^{xx}	942^{xx}
7. Rating - Scale III								799^{xx}
8. Rating - Scale Total								-

x $p < .05$; xx $p < .01$.

Some of the erratic fluctuations in the signs and size of the correlations between the mosaic test variables are undoubtedly attributable to sampling errors caused by the relatively small size of the samples. Some of the errors can be controlled by recomparing the correlations and for lager groups, by combining both boys and girls of the smae grade in the urban schools, and in the rural schools. These 'correlations' based upon samples of larger sizes will be less subject to sampling errors. The correlations for combined male and female subjects, of each of the three grades of the urban schools are shown in Table 15 - 23.

For the 4 objective variables, among the 6 correlations, for Grade I, males and females combined, only three are low negative - all these are correlations of 'number of sub-designs' with the remaining three variables. The remaining 3 correlations are all positive, and significant beyond .01 level. The situation is almost similar in Grade II, male and female combind; here out of the 6 correlations, only two are low negative - and one low positive, - again, all these correlations are of the variable 'number of subdesigns' with the remaining three variables. The other three correlations are high and positive, all significant beyond .01 level. In Grade V, all the correlations are positive, save one; this is between 'time taken' and 'number of subdesigns'.

The correlations between objective feature variables and subjective feature variables, are generally negative. Only 1 out of 16 in Grade I is positive; 6 out of 16 in Grade are positive, in Grade II; and in Grade V, 12 out of 16 are positive.

As expected all the correlations among the rated subjective feature variables are positive and high in all the three grades. So far we have been considering the intercorrelation between objective and subjective features of the mosaic test for different types of urban groups. Now let us consider the same intercorrelations obtained from rural groups. These are shown in Table 15 - 24.

Table 15 - 23.

Product-moment inter-correlations among Mosaic Test variables for 11 subjects of three grades of the Urban Schools.

Variables	Mosaic Test Variables							
	Objective features				Subjective features			
	1	2	3	4	5	6	7	8
Grade I M+F N = 108								
1. Time taken		531^{xx}	-64	483^{xx}	-069	051	-125	-032
2. Total No. of pieces			-006	887^{xx}	-071	-114	-330^{xx}	-147
3. No. of subdesigns				-016	-127	-116	-039	-152
4. Area covered					-068	-107	-320^{xx}	-139
5. Rating - Scale I						828^{xx}	713^{xx}	937^{xx}
6. Rating - Scale II							732^{xx}	949^{xx}
7. Rating - Scale III								828^{xx}
8. Rating - Scale Total								-
Grade II, M+F, N=96								
1. Time Taken		758^{xx}	053	686^{xx}	051	014	-178	-006
2. Total No. of pieces			-044	871^{xx}	125	035	-263^{xx}	025
3. No. of subdesigns				-047	-203^{x}	-115	-074	-160
4. Area covered					032	007	-270^{xx}	-29
5. Rating - Scale I						842^{xx}	595^{xx}	936^{xx}
6. Rating - Scale II							695^{xx}	965^{xx}
7. Rating - Scale III								764^{xx}
8. Rating - Scale Total								-
Grade V, M+F, N = 97								
1. Time taken		593^{xx}	161	605^{xx}	043	063	-131	039
2. Total No. of Pieces			329^{xx}	887^{xx}	149	128	-141	118
3. No. of subdesigns				337^{xx}	135	169	-004	147
4. Area covered					179	156	-124	156
5. Rating - Scale I						768^{xx}	529^{xx}	901^{xx}
6. Rating - Scale II							591^{xx}	925^{xx}
7. Rating - Scale III								679^{xx}
8. Rating - Scale Total								-

x $p < .05$; xx $p < .01$.

Table 15 - 24.

Product-moment inter-correlations among Mosaic Test variables for all subjects of the three grades of Rural Schools.

Mosaic Test Variables	Objective features 1	2	3	4	Subjective features 5	6	7	8
Grade-I M+F, N=96								
1. Time taken		345^{xx}	096	263^{xx}	-053	-062	-136	-081
2. Total No. of pieces			070	821^{xx}	-136	-207^{x}	-405^{xx}	-243^{x}
3. No. of sub-designs				076	-084	000	-025	-039
4. Area covered					-174	-222^{x}	-308^{xx}	-242^{x}
5. Rating - Scale I						826^{xx}	674^{xx}	934^{xx}
6. Rating - Scale II							706^{xx}	951^{xx}
7. Rating - Scale III								823^{xx}
8. Rating - Scale Total								-
Grade II, M+F = 92								
1. Time taken		326^{xx}	218^{x}	320^{xx}	-042	036	-021	006
2. Total No. of pieces			156	931^{xx}	-046	001	-116	-045
3. No. of sub-designs				165	-151	-013	040	-070
4. Area covered					-140	-060	-170	-124
5. Rating - Scale I						766^{xx}	592^{xx}	909^{xx}
6. Rating - Scale II							669^{xx}	932^{xx}
7. Rating - Scale III								754^{xx}
8. Rating - Scale Total								-
Grade V M+F = 114								
1. Time taken		529^{xx}	027	421^{xx}	-179	-234^{xx}	-278^{x}	-242^{xx}
2. Total no. of pieces			143	872^{xx}	-108	-201^{x}	-412^{xx}	-222^{x}
3. No. of sub-designs				179	-021	-113	-125	-089
4. Area covered					-116	-218^{x}	-425^{xx}	-236^{x}
5. Rating - Scale I						780^{xx}	614^{xx}	914^{xx}
6. Rating - Scale II							722^{xx}	954^{xx}
7. Rating - Scale III								796^{xx}
8. Rating Scale Total								-

^{x} $p < .05$; ^{xx} $p < .01$.

First, we find, that correlations between the objective features all tend to be positive in all the three age-grade groups. We also note, that the correlation coefficients tend to increase in size, as we go from Grade I through Grade II to Grade V. Thus, in Grade I, 3 coefficients reach significance at .05 level or better; in Grade II, 4 coefficients reach significance at .05 level or better; in Grade V, also 4 coefficients are significant. But the correlations between objective features on one hand, and subjective features on the other, are, by and large, negative. Thus in Grade I, out of a total of 16 correlation coefficients, only one is positive; in Grade II, 4 co-efficients have positive signs; in Grade V, there are no positive correlations at all. While most of these correlations are so low as to be statistically non-significant, there are a few which are statistically significant. But these may be due to sampling errors as well.

The intercorrelation between rated features of the mosaics are uniformly high and positive, in all the three grades.

Next, we may like to find out how the factor of sex operates on these correlations from one grade to another, when both urban and rural schools are combined. These correlations for all males subjects of the three grades are shown in Table 15 - 25.

First, let us note, that for the correlations among objective features, in Grade I, there are three coefficients which are negative, and three are positive - but these are all significant beyond .01 level. In Grade II, all the size correlations are positive, and 3 of them, as in Grade I, are significant beyond .01 level. The situation is exactly similar in Grade V.

Further, we note that the correlations between objective features and subjective feature are all in general negative. Thus in Grade I, out of 16 correlation coefficients,

Table 15 - 25.

Product-moment correlations among Mosaic Test variables for male subjects of three grade for urban and rural schools pooled together.

Mosaic Test Variables	1	2	3	4	5	6	7	8
	Mosaic Test Variables.							
	Objective features				Subjective features			
Grade I Male, U+R N=127								
1. Time taken		479^{xx}	-111	442^{xx}	049	180^{x}	-059	082
2. Total No. of pieces			-062^{xx}	868	-060	-128	-323^{xx}	-151
3. No. of sub-designs				-068	-134	-105	065	-107
4. Area covered					-055	-102	-276^{xx}	-127
5. Rating - Scale I						809^{xx}	673^{xx}	930^{xx}
6. Rating - Scale II							691^{xx}	940^{xx}
7. Rating - Scale III								806^{xx}
8. Rating - Scale Total								-
Grade II, Male, U+R N=123								
1. Time taken,		745^{xx}	106	662^{xx}	088	096	-051	073
2. Total No. of pieces			123	870^{xx}	146	128	-170	089
3. No. of sub-designs				040	-163	-061	-046	-114
4. Area covered					021	040	-224^{x}	-016
5. Rating - Scale I						798^{xx}	606^{xx}	919^{xx}
6. Rating-Scale II							691^{xx}	946^{xx}
7. Rating - Scale III								766^{xx}
8. Rating - Scale Total								-
Grade V, Male = U+R N=148								
1. Time taken		589^{xx}	008	504^{xx}	-024	-041	-160	-051
2. Total No. of pieces			088	892^{xx}	003	-032	-269^{xx}	-050
3. No. of sub-designs				127	-045	-110	-114	-090
4. Area covered					-012	-030	-262^{xx}	-049
5. Rating - Scale I						808^{xx}	628^{xx}	923^{xx}
2. Rating - Scale II							682^{xx}	941^{xx}
3. Rating - Scale III								759^{xx}
4. Rating - Scale Total								-

X p $<$ .05; XX p $<$ .01.

only 4 are positive; in Grade II, 8 are positive, but in Grade V, only one coefficient has positive sign.

As expected, inter-correlations between the subjective rated features are all positive and high.

Next, the correlations for all female subjects of the three different grades, are shown in Table 15-26.

It will be seen, that those trends are same from one group to another, for females also. In Grade I, among the six inter-correlations between the objective features, all of which are positive, 3 are significant beyond .01 level; In Grade II, the same 3 correlations are also significant beyond .01 level, but of the remaining three correlations, one is zero, and two are negative. In Grade V, however, all the six coefficients are not only positive but 5 of them are significant beyond .01 level.

Turning to inter-correlations between objective features and subjective features, we note that they are, as before, mostly negative. In Grade I, only one coefficient is positive; in Grade II, there are just two coefficients with positive sign; in Grade V, however, 10 of these coefficients are positive. Most of the correlations have low values.

Of course, the inter-correlations between the subjective features are all positive and high.

Some of the fluctuations in the correlation values that occur due to sampling can further be stabilized by having still larger groups - though their homogeneity with regard to sex and location of schools may still be maintained. Thus inter-correlations between the subjective and objective features of the mosaics for subjects of all the three grades, but of one sex, male, and for two locations of school are shown in Table 15-27.

The dispositions of the correlation values in the urban and rural groups are very similar. Thus, in the urban sample of all male subjects, we find that all the six correlations among the objective variables are positive, three

Table 16 - 26.

Product-moment correlations among Mosaic Test variables for female subjects of three grades for urban and rural schools pooled together.

Mosaic Test variables	Mosaic Test Variables: Objective features 1	2	3	4	Subjective features 5	6	7	8
Grade I, Female, U+R N=77								
1. Time taken		446^{xx}	055	415^{xx}	-132	-107	-109	-124
2. Total No. of pieces			124	863	-132	-149	-385^{xx}	-202
3. No. of sub-designs				139	-062	019	-178	-052
4. Area covered					170	-181	-332^{xx}	-221^{x}
5. Rating-Scale I						867^{xx}	739^{xx}	948^{xx}
6. Rating-Scale II							774^{xx}	967^{xx}
7. Rating-Scale III								859^{xx}
8. Rating-Scale Total								-
Grade II, Female, U+R N=65.								
1. Time taken		491^{xx}	000	524^{xx}	-075	-013	-178	-070
2. Total No. of pieces			094	936^{xx}	-053	-091	-220	-106
3. No. of sub-designs				-077	-147	-045	085	-009
4. Area covered					-06[illegible]	-056	184	-087
5. Rating-Scale I						828^{xx}	569^{xx}	931^{xx}
6. Rating-Scale II							680^{xx}	961^{xx}
7. Rating-Scale III								752^{xx}
8. Rating-Scale Total								-
Grade V, Female, U+R N=63								
1. Time taken		540^{xx}	141^{xx}	555^{xx}	094	112	-136	072
2. Total No. of pieces			370^{xx}	853^{xx}	132	040	-256^{x}	020
3. No. of sub-designs				396^{xx}	192	159	-038	154
4. Area covered					155	-006	-340^{xx}	-013
5. Rating-Scale I						701^{xx}	445^{xx}	865^{x}
6. Rating-Scale II							609^{xx}	946^{x}
7. Rating-Scale III								707^{x}
8. Rating Scale Total								-

x $p < .05$; xx $p < .01$.

Table 15 - 27

Product-moment inter-correlations among the Mosaic Test variables for male subjects of all three grades combined, from urban and rural schools.

Variables	Mosaic Test Variables							
	Objective features				Subjective features			
	1	2	3	4	5	6	7	8
Male Grade I+II+V, Urban N=188								
1. Time taken		.639^{xx}	011	475^{xx}	151^{x}	196^{xx}	-020	158^{x}
2. Total No. of pieces			080	835^{xx}	159^{x}	136	-162^{x}	113
3. No. of subdesigns				024	-111	-039	-009	-079
4. Area covered					022	017	-224^{xx}	-013
5. Rating-Scale I						852^{xx}	669^{xx}	940^{xx}
6. Rating-Scale II							703^{xx}	961^{xx}
7. Rating-Scale III								779^{xx}
8. Rating-Scale Total								-
Male Grade I+II+V, Rural N=210								
1. Time taken		518^{xx}	095	362^{xx}	107	103	019	100
2. Total No. of pieces			135^{x}	824^{xx}	-005	-046	-229^{xx}	-067
3. No. of subdesigns				132	-084	-097	-064	-095
4. Area covered					-080	-097	-240^{xx}	-124
5. Rating-Scale I						830^{xx}	682^{xx}	936^{xx}
6. Rating-Scale II							728^{xx}	957^{x}
7. Rating-Scale III								810^{xx}
8. Rating-Scale Total								-

^{x} $p < .05$; ^{xx} $< .01$.

of which are significant at better than .01 level. But in the rural group, there is a trend towards some perceptible increase in the size of the same six correlation coefficients. Here, the same three correlations are positive and significant beyond .01 level; additionally, there is one more coefficient, which attains significance at .05 level, and one just misses it.

With regard to the correlations between objective features and subjective features, the previous tendency for them to be low negative is seen to persist. Thus, in the urban group, there are six coefficients of positive sign (out of 16), but in the rural group, there are only 4 coefficients with positive sign.

The correlations between the same type of groups but for female subjects are shown in Table 15-28. The disposition of the inter-correlations do not show much difference from those for the male groups. In the urban group of all female subjects, 4 of the correlations coefficients out of six, all of which are positive - between objective features, are significant at .05 level or better. In the male group of all female subjects, the number of statistically significant correlation coefficients is three. When, the rural and urban groups are combined, 5 out of six coefficients attain significance at .05 level or better. Turning to the inter-correlation between subjective and objective features of the mosaic, we note, that in the urban group of female subjects, 10 out of 16 correlation coefficients are positive. But in the rural group of female subjects, only 5 out of 16 correlations are positive. In the entire group of all female subjects, 8 out of 16 correlations are positive. Most of them are not significantly different from zero.

The above analysis seems to point out that neither sex, nor location appears to exert very systematic influence on the inter-relationship among the objective and subjective features of the mosaic designs. But since, deve-

Table 15 - 28.

Product-moment intercorrelations among Mosaic Test Variables for female subjects of all three grades combined for urban, for rural, and for urban and rural schools pooled together.

Mosaic Test variables.	Mosaic Test Variables: Objective features				Subjective features			
	1	2	3	4	5	6	7	8
Female, Grade I+II+V N=113								
1. Time taken		593^{xx}	206^{x}	547^{xx}	086	099	-088	069
2. Total No. of pieces			118	859^{xx}	102	046	-207^{x}	030
3. No. of sub-designs				081	184	052	-069	022
4. Area covered					031	-010	-234^{x}	-032
5. Rating-Scale I						846^{xx}	638^{xx}	941^{xx}
6. Rating-Scale II							694^{xx}	965^{xx}
7. Rating-Scale III								779^{xx}
8. Rating-Scale Total								-

Mosaic Test variables.	1	2	3	4	5	6	7	8
Female, Grade I+II+V Rural N=92								
1. Time taken		396^{xx}	044	366^{xx}	052	072	-096	038
2. Total No. of pieces			156	932^{xx}	-029	-049	-234^{x}	-083
3. No. of sub-designs				198	-002	-009	-013	038
4. Area covered					-083	-118	-284^{xx}	-147
5. Rating-Scale I						831^{xx}	663^{xx}	932^{xx}
6. Rating-Scale II							761^{xx}	963^{xx}
7. Rating-Scale III								829^{xx}
8. Rating-Scale Total								-

Mosaic Test variables.	1	2	3	4	5	6	7	8
Female, Grade I+II+V Urban+Rural N=205								
1. Time taken		501^{xx}	082	477^{xx}	080	106	-054	075
2. Total No. of pieces			136^{x}	887^{xx}	046	004	-222	-021
3. No. of sub-designs				136^{x}	000	055	-053	-076
4. Area covered					-013	-049	-246	-076
5. Rating-Scale I						839^{xx}	644^{xx}	936^{xx}
6. Rating-Scale II							722^{xx}	[illegible]^{xx}
7. Rating-Scale III								800^{xx}
8. Rating-Scale Total								-

x $p < .05$; xx $p < .01$.

But since, developmental factors, more purely reflected in age-grade, appear to exert a more decisive influence on the mosaic performance, we may look into its influence on the inter-correlations, by considering fairly large groups, which are heterogeneous with respect to sex and location of schools but homogenous with respect to age-grade. These correlations are shown in Table 15-29.

First, we note that in Grade I subjects of both the sexes, and schools of both locations, there is one negative correlation, among the correlation coefficients from the objective variables of the remaining 5 positive correlations, three are significant beyond .01 level. In Grade II, all the six correlations are positive, and 3 of them are significant beyond .01 level. In Grade V, not only all six coefficients are positive, 5 of them are now significant at .05 level or better.

Coming to inter-correlations between objective and subjective features, we note that, in Grade I, one out of 16 are positive; in Grade II, 7 out of the 16 coefficients are positive; in Grade V, only 2 are positive out of 16 coefficients.

Lastly, we may look into correlations in the largest heterogeneous groups, the only factor of homogeneity being location in urban or rural schools. These correlations are shown in Table 15-30.

Here, first we note that in the entire urban sample consisting of subjects of all the three grades and both the sexes, among 6 coefficients of correlation among the objective features - all of which are positive, three are significant beyond .01 level; but among the entire rural samples out of the 56 correlation coefficients, all of which are positive, 45 reach significance at least at .05 level; and one misses significance at this level by .002 points only. In the entire sample of all subjects the situation is identical.

Table 15 - 29

Product-moment inter-correlations among Mosaic Test variables for three grades, pooled over male and female subjects of urban and rural schools.

Mosaic Test Variables	Mosaic Test Variables: Objective features 1	2	3	4	Subjective features 5	6	7	8
Grade I, M+F, U+R N=204								
1. Time taken		467^{xx}	-033	432^{xx}	-021	057	-077	-003
2. Total No. of pieces			026	859^{xx}	-088	-140^{x}	-347^{xx}	-173^{x}
3. No. of sub-designs				016	-101	-050	-042	-083
4. Area covered					-092	-132	-292^{xx}	-160^{x}
5. Rating-Scale I						830^{xx}	699^{xx}	936^{xx}
6. Rating-Scale II							723^{xx}	951^{xx}
7. Rating-Scale III								827^{xx}
8. Rating-Scale Total								
Grade II, M+F, U+R N=188								
1. Time taken		639^{xx}	086	627^{xx}	032	053	-092	022
2. Total No. of pieces			049	857^{xx}	068	042	-185^{x}	014
3. No. of sub-designs				015	-160^{x}	-063	-014	-105
4. Area covered					-001	015	-207^{xx}	-032
5. Rating-Scale I						811^{xx}	593^{xx}	924^{xx}
6. Rating-Scale II							686^{xx}	953^{xx}
7. Rating-Scale III								761^{xx}
8. Rating-Scale Total								
Grade V, M+F, U+R N=211								
1. Time taken		564^{xx}	034	513^{xx}	-003	-003	-154^{x}	-026
2. Total No. of pieces			155^{x}	877^{xx}	039	-009	-264^{xx}	-029
3. No. of sub-designs				187^{xx}	-001	-053	-096	-042
4. Area covered					032	-023	-279^{xx}	-039
5. Rating-Scale I						780^{xx}	579^{xx}	910^{xx}
6. Rating-Scale II							661^{xx}	941^{xx}
7. Rating-Scale III								743^{xx}
8. Rating-Scale Total								

^{x} $p < .05$; ^{xx} $p < .01$.

Table 13 - 30.

Product-moment inter-correlations among Mosaic Test variables for subjects of all the three grades from urban schools, from rural schools, and from urban and rural schools pooled together.

Mosaic Test Variables.	Mosaic Test Variables. Objective features 1	2	3	4	Subjective features. 5	6	7	8
All urban subjects N=301								
1. Time taken		622^{xx}	079	496^{xx}	132^{x}	162^{xx}	-049	127^{x}
2. No. of pieces			100	825^{xx}	139^{x}	100	-184^{xx}	079
3. No. of subdesigns				044	-059	-003	-036	-041
4. Area covered					026	008	-228	-019
5. Rating-Scale I						849^{xx}	655^{xx}	939^{xx}
6. Rating-Scale II							699^{xx}	956^{xx}
7. Rating-Scale III								778^{xx}
8. Rating-Scale Total								
All rural subject N=302								
1. Time taken		453^{xx}	083	356^{xx}	089	093	-012	081
2. No. of pieces			132^{x}	867^{xx}	-013	-045	-236^{xx}	-073
3. No. of sub-designs				146^{x}	-063	-050	-047	-060
4. Area covered					-080	-103	-260^{xx}	-132^{x}
5. Rating-Scale I						831^{xx}	672^{xx}	934^{xx}
6. Rating-Scale II							735^{xx}	959^{xx}
7. Rating-Scale III								813^{xx}
8. Rating-Scale Total								
All subjects N=603								
1. Time taken		568^{xx}	037	473^{xx}	127^{xx}	154^{xx}	-016	124^{x}
2. No. of pieces			093	833^{xx}	082	050	-196^{xx}	025
3. No. of sub-designs				068	-063	-043	-048	-058
4. Area covered					-002	-016	-221^{xx}	-046
5. Rating-Scale I						842^{xx}	664^{xx}	937^{xx}
6. Rating-Scale II							716^{xx}	957^{xx}
7. Rating-Scale III								795^{xx}
8. Rating-Scale Total								

x $p < .05$; xx $p < .01$.

So far as intercorrelations between objective and subjective features are concerned, we note that, in the urban sample, only 3 out of the 16 such coefficients are positive. Correlations among the subjective features are uniformly high and positive.

III. <u>Correlation between Intervening and Achievement Test variables on one hand, and Mosaic Test variables on the other.</u>

We have studied in some detail the nature of inter-correlation among variables belonging to the intervening, and achievement test categories, and also among variables related to certain objective and certain rated subjective variables of the mosaic test output.

Mosaic Test performance can also be viewed as a special case of achievement - in that the subject is required to carry out a task - albeit, the choice of the exact task to be carried out is left to the <u>s</u> himself. Again, there is no deliberate training given to the pupils how to peform in the mosaic test - as is imparted in the other two achievement tasks, Hindi and mathematics. Whatever other two achievement tasks, Hindi and mathematics. Whatever training or skill the child has acquired which incidentally help him in carrying out the mosaic test, are indirect, and remote. Mosaic test is altogether a novel task before each child.

Keeping in mind such similarity as well as differences, of the mosaic test performance with the other two achievement tests, we may like to see how the objective and subjective features of the mosaic tests are correlated with the intervening variables, and performance in the achievement tests.

We have already found that the scores in the three sub-tests of the Hindi achievement test are highly, and positively correlated. So instead of taking the scores in each of the three subtests separately, it will be profitable to take the 'total score', as the most representative variable for measuring language achievement.

Likewise, since the ratings in the three subscales for assessing pattern qualities, aesthetic qualities, and miscellaneous qualities, are highly correlated among themselves, the total scale score, will be the most representative test for measuring qualitiative features of the mosaic design. In this way, in one category we have now five intervening variables and two achievement test variables making a total of 7 variables. For the mosaic test we will have a total of 5 variables, comprizing 4 objective feature variables and one total rating for the subjective feature variable.

The correlation between the 7 intervening and achievement test variables on one hand, and five mosaic test variables on the other, for the boys and girls of the three grades of the urban schools are shown in Table 15 - 31.

First, let us take the variable 'mental age'. It will be noted that mental age has generally low or moderately sized positive correlations with all the mosaic test variables, save one - viz., 'number of sub-designs'. This is true for all the six groups - two sex groups for each of the three grades, Secondly, there is a perceptible trend towards an increase in the magnitude of the correlations as we go from Grade I through Grade II to Grade V, so that, in Grade V girls, even the correlation with 'number of sub-design' which has been low negative throughout in previous 6 groups, become very low negative throughout in previous 5 groups, become very low positive. The third interesting, and important point worthy of note is that 'mental age' has a moderate, positive correlation with 'total rating score' of the mosaic. With the exception of one group, Grade I girls, this correlation is significant at .05 level (2 groups) and at .01 level in (3 groups).

The same type of relationship is also found with the second variable, 'intelligence quotient'. However, this is but expected, as IQ is derived from mental age itself.

The tendency of the correlation value to increase in the higher grades is a little more clearcut with IQ, compared to 'mental age'. The xxxxxxxxxxxx modorately high value of the correlations of IQ with 'total rating' is noteworthy - in only one group, Grade I - girls, that it misses significance at .05 level. In other cases, it is significant beyond .05 level or even .01 level in some groups. The third variable, 'social maturity' behaves rather unsystematically, in relation to the mosaic test variables from group to group. Most of the correlations are low; few, if any, reach statistical significance, even at .05 level. But one difference is noteworthy. In the boys groups, the correlations of 'social maturity' with the mosaic test variables have tended to be positive - there being only one negative correlation, among 15 reported for the 3 grades. But for the girls, the number of negative correlations increases there being 2 negative correlations out of 5 in Grade I, 4 negative correlations out of 5 in Grade II, and 3 negative correlations out of 5 in Grade V.

The fourth intervening variable, 'moral relativism' behaves somewhat differently than 'social maturity'. In Grade I boys, it is low, and two of the correlations are negative. In Grade I girls, however, all the correlations are positive, and somewhat larger in magnitude. In Grade II, another picture is seen. Among boys, the correlations are larger than in the case of Grade I boys, and all are positive save one. But in Grade II girls, the reverse is true. There are 4 negative correlations, but one moderately sized positive correlation - with 'total rating'. In Grade V, all the correlations are positive. In the boys group, the magnitude of the correlations is small; but in the girls group, it increases quite appreciably - four of them being statistically significant - one of them at .05 level, and three at .01 level.

But the most noteworthy point, with regard to his variable of 'moral relativism' is that it has invariably got

a positive correlation with 'total rating' of the mosaic test.

The fifth variable is 'sociometric status index'. In general it has low positive or low negative correlations with the five mosaic test variables. For the boys, there is little difference from one grade to another. For the girls, there is a slight difference, though: whereas in Grade I, all the correlations with this variable are positive (2 of them significant at .05 level), in Grade II, these are reduced, with 2 of the correlations becoming negative, and the situation is the same in Grade V also. Again, it may be noted, that 'sociometric status index' has positive correlation with 'total rating' in 5 groups out of six.

The next variable is the 'language achievement total'. This variable shows a systematic trend in its correlations with the mosaic test variables, as we go from group to group. Its correlation with 'number of subdesigns' is always negative, with one exception - in girls group of Grade V. Otherwise it has moderate or low positive correlation with the remaining mosaic test variables. Among the boys groups, the correlation values are of similar magnitude in Grades I and II, but in Grade V, it is reduced. But among the girls groups, the magnitude of the correlations tends to increase from Grade I to Grade II, and still further to Grade V. As pointed out earlier, in Grade V girls, 'language achievement' has positive correlations with all the five mosaic test variables, one of which is significant at .05 level, and three of them significant at .05 level.

The last variable to be considered is 'mathematics achievement'. Its behaviour with respect to the mosaic test variables, is quite similar to that of the 'language achievement'. Usually it has a low or moderately sized psoitive correlation with the mosaic test variables. However, with 'number of subdesigns' its correlation is negative, in Grade I, boys and girls groups, and Grade II boys group. It also correlates negatively with 'time taken', 'number

of pieces' and 'area covered' in girls group of Grade II. The remaining correlations are positive. Its correlation with 'total rating' is of moderate magnitude - the minimum being .220 (Grade I, girls), and maximum being .426 (Grade V, boys) with the exception of the lowest correlation value ie, .220 (Grade I, girls), all the remaining 5 correlations are significant, at .05 level, the three highest .426 (Grade V, boys) and .381 (Grade I, boys) and .332 (Grade II, boys) being significant beyond .01 level. The correlation of 'mathematics achievement' with 'rating total' is usually of somewhat lower magnitude in the girls groups. However, the tendency for this correlation to increase, between 'mathematics achievement' and 'total rating' of the mosaic design, as we go from Grade I through Grade II to Grade V, is unmiskable.

So far we have been concerned with the correlations obtained from test results of urban boys and girls. Now, we can turn to the consideration of the same correlations for the rural boys and girls.

The correlations between chosen mosaic test variables on one hand, and intervening and achievement tests variables on the other, for boys and girls groups of the three grades from the rural schools, are shown in Table 15-32. The two most important points which at once catch attention, from the correlations given in the six matrices the pre-dominance of negative signs of the correlations, and their small size in general. Let us study the correlations, variable by variable.

First, we have mental age. It has in general low negative or low positive correlations with the mosaic test variables, in all the six groups, of rural subjects. In Grade I, four correlations are negative in the male group and an equal number of correlations are negative in the female group. The positive correlations in both the groups is between 'mental age' and 'total rating'. The situation improves somewhat in Grade II: now we have only one negative

Table 15 - 31.

Product moment correlation between Mosaic test variables and Intervening and Achievements Test variables for subjects of all three grades of the urban schools.

Intervening and Achievements Test Variables.	Male: Mosaic test Variables 1 Time taken	2 No. of pieces	3 Sub-designs	4 Area	5 Rating Total	Female: Mosaic Test Variables 1 Time taken	2 No. of pieces	3 Sub-design	4 Area	5 Rating Total
	N=66					N=42				
Grade I										
1. Mental age	169	135	-121	127	378xx	047	202	-052	138	118
2. I.Q.	177	081	-117	069	386xx	132	261x	-056	204	138
3. Social Mat.	-119	105	057	110	137	074	-016	-328xx	008	140
4. Moral Relat.	081	001	-40	002	163	363xx	220	010	125	015
5. Sociom. Ind.	096	047	035	029	165	363xx	224	089	389xx	110
6. Long Ach. Tat	393xx	334xx	-180	254x	391xx	266x	391xx	-142	365xx	093
7. Maths. Ach.	317xx	256x	-099	185	381xx	170	273x	-229	216	220
	N=57					N=39				
Grade II										
1. Mental age	209	175	-035	046	251	213	330x	-101	282	293
2. I.Q.	226	172	032	042	261x	197	339x	-120	295	276
3. Social Mat.	152	000	045	048	038	-196	-108	026	-019	-067
4. Moral Relat.	203	329	-010	349x	109	-350x	-136	-029	-031	322x
5. Sociom. Ind.	008	-090	060	-089	083	014	182	-228	181	-189
6. Long Ach. Tot.	360xx	378x	-203	294x	391x	208	262	-095	302	407x
7. Maths. Ach.	318x	257	-209	202	352x	-133	-129	059	-059	347x
	N=65					N=32				
Grade V.										
1. Mental Age	178	236	-034	306x	390xx	342	201	002	031	301
2. I.Q.	133	216	023	292	365xx	334	183	037	046	332
3. Soc. Mat.	172	125	033	112	151	-341	-231	203	-151	145
4. Moral Rel.	122	093	042	058	001	628xx	510xx	308	521xx	237
5. Sociom. Ind.	-016	135	118	075	101	075	-001	-055	010	299
6. Long. Ach. Tot	096	089	-008	108	193	547xx	456x	281	399x	500
7. Maths. Ach.	301	227	060	252	426xx	345	107	029	097	415

x P $\angle$ .05; xx P $\angle$ .01

Table 15 - 32.

Product-moment correlations between Mosaic Test variable and intervening and achievement Test variables for subjects of all three grades of the Rural Schools.

Intervening and Achievement Test.	MALE Mosaic Test Variables. Time taken 1.	No. of pieces. 2.	Sub-design. 3.	Area 4.	Rating Total. 5.	FEMALE Mosaic Test Variables. Time taken 1.	No. of pieces. 2.	Sub-design. 3.	Area 4.	Rating Total. 5.
Grade I	N=61					N=35				
1. Mental age	-037	-150	-117	-199	099	-316	-260	+142	-349x	345x
2. I.Q.	016	-097	-163	-137	-065	-254	-266	-134	-361x	290
3. Social Mat.	031	-071	114	-060	043	141	311	-010	424x	106
4. Moral Relat.	119	099	072	-013	-041	-041	-282	-429x	-258	-472xx
5. Sociom. Index	185	-019	074	001	070	320	058	120	068	166
6. Long Ach. Tot.	-050	-144	-049	-125	185	-172	-178	-190	-288	254x
7. Maths. Ach.	056	-059	-255x	-101	283	-173	-186	-067	-317	370x
Grade II	N=66					N=26				
1. Mental Age	012	279x	-082	207	094	-052	-262	325	-285	016
2. I.Q.	056	273x	-078	184	100	-056	-278	331	-301	039
3. Social Mat.	-048	046	165	-051	081	010	343	158	345	-117
4. Moral Relat.	-104	099	094	182	-127	069	-160	-404	-140	-114
5. Sociom. Index	121	104	-051	054	-013	031	190	-189	187	-169
6. Long. Ach. Tot.	067	152	135	096	127	067	-293	-242	-341	-108
7. Math. Ach.	126	-157	023	-148	113	002	-293	-355	-271	-195
Grade V	N=83					N=31				
1. Mental age	184	-005	-101	043	-084	085	-094	-224	-306	126
2. I.Q.	166	-023	-132	010	-035	151	-026	-212	-254	128
3. Social Mat.	-142	-177	019	-233x	-055	406	350	-085	288	-093
4. Moral Relat.	-067	133	-031	185	-026	-001	-150	-062	010	074
5. Sociom. Ind.	040	-124	-060	-112	-061	-113	-003	-061	000	305
6. Long. Ach. Tot	132	113	047	065	-002	-357x	-281	-141	-279	254
7. Math. Ach.	067	122	-035	054	-039	-213	-313	-121	-271	-017

x $p < .05$; xx $p < .01$.

correlation in the boys group, and three negative correlations in the girls group. As in Grade I, 'mental age' correlates positively with 'rating total' in Grade II, boys as well as girls group. In Grade V, the situation worsens; there are three negative correlations in the boys group, and an equal number of negative correlations in the girls group. 'Mental age' correlates positively with 'rating total' in the girls group of Grade V, but it correlates negatively in the boys group of Grade V.

The second variable, IQ, in general behaves similarly to the previous variable 'mental age' which is to be expected on logical grounds.

Thus it is noteworthy, that of the 30 correlations in six groups reported for mental age, 18 are negative, and 12 positive. Again, among the 30 correlations in six groups reported for IQ, 18 are negative, and 12 are positive. Of the 12 correlations reported in which 'rating total' is correlated with 'mental age' or IQ, 8 are positive one of them even significant at .05 level.

The correlation of the next variable 'social maturity' with the mosaic test variables also shows the same irregularity as shown by the two intelligence variables, viz., mental age and IQ. The correlations of social maturity with the mosaic test variables are usually low, and both positive and negative. In Grade I, boys, there are 2 negative correlations, but in Grade I girls, there is just one negative correlation. In Grade II, there are 2 negative correlations, in both boys and girls groups. The number of correlations which are negative is 4 in boys group of Grade V, but it is 2 in girls group of Grade V.

Thus out of 30 correlations, 5 each in six groups in which 'social-maturity' is correlated with mosaic test variables, 13 are negative - not very different from what would be expected on the basis of chance. Even 'total rating scale' correlates with 'social maturity' positively.

3 times, and negatively 3 times.

The situation, is the same, with 'moral relativism' with minor differences from one group to another. The correlations are low, either positive or negative. Out of 30 correlations reported, in which moral relativism is correlated with five different mosaic test variables, 18 are negative, and 12 are positive, and there is no systematic trend, either due to sex, or due to grade. However, in the male groups, there is a smaller number of negative correlations (7 out of 15), as compared to, in the girls groups, where the number of negative correlations with 'moral relativism' is comparatively larger (11 out of 15). The last intervening variable, 'sociometric status index' shows the same irregular fluctuations in its correlation with the mosaic test variables. Usually the correlation values are low, some of which are positive, and some negative. However, it is noteworthy, that there are more positive correlations than negative ones, in the thirty correlations for the six groups reported here. For example, in Grade I boys, there is one negative correlation; in Grade II boys, there are 2 negative correlations; in Grade V boys, there are 4 negative correlations, on the other hand, in Grade I girls, there is no negative correlation; in Grade II girls, there are 2 negative correlations. Thus from all the 6 groups taken together, there are 11 negative correlations out of a total of 30.

The 'language achievement total' always correlates rather poorly with all the five mosaic test variables. However, there is some systematic trend, as one goes from the group of youngest children to groups of older children. For example, among boys in Grade I, 4 correlations are negative; in Grade II, none is negative; in Grade V, only one is negative. Thus for boys groups, the correlation of 'language achievement' with mosaic test variables seems to increase in magnitude towards the positive direction. This

tendency for the correlation between language achievement on one hand and mosaic test variables on the other to increase from Grade I through Grade V among the boys groups, is not replicated by the girls groups, though, here, the correlations are predominantly negative, in all the three grades. There are 4 negative correlations in Grade I, and the same number of negative correlations in Grade II and V. Thus we see, that whereas among the three boys groups, there are only 5 negative correlations involving language achievement and mosaic test variables, among the girls groups there are 12 negative correlations involving the same sets of variables. This might be an interesting sex linked peculiarity.

The last variable to be considered is mathematics achievement. Here, the trend is more or less the same as with language achievement. In the boys group of Grade I, there are three negative correlations; in Grade II, there are two negative correlations; in Grade V also there are two negative correlations. In the girls groups, in Grade I, there are 4 negative correlations; in Grade II, as well as in Grade V, the number of negative correlations with this variable, mathematics achievement, is 4 each. Thus, whereas there are only 7 negative correlations out of 15 for the boys group, there are as many as 12 negative correlations out of 15 for the girls groups. If a quick **recapitulation** is to be made of the correlations between the mosaic test variables on one hand and intervening and achievement test variables on the other, the best thing is to draw a comparison between the signs of the correlation in the six matrices of correlations reported for each of the urban and rural schools. The number of correlations which are negative in each of the six matrices, in the urban and rural schools has been shown in Table 15-33.

Several interesting points can be teased out from the figures of negative correlations shown in Table 15-33.

We should remember, that each number represents

Table 15 - 33.

Number of negative correlations in each of the six correlation matrices for urban and rural schools, for correlations between mosaic test variables on one hand and intervening and achievement test variables on the other.

Grade	Urban			Rural			Urban+Rural		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
I	7	6	13	20	21	41	27	27	54
II	6	16	22	10	22	32	16	38	54
V	3	5	8	20	22	42	23	27	50
Total	16	27	43	50	65	115	66	92	158
Out of	105	105	210	105	105	210	210	210	420

the number of correlations which are negative in a matrix having 35 correlations altogether. Under the column heading of Total, the number of correlations out of which the negative correlations are counted is thus 70. In the last matrix, giving the number of negative correlations for urban and rural schools together, the total number of correlations in each row is 140.

First, as we go from urban schools to rural schools, the number of negative correlations definitely goes up - from 43 out of 210 in urban schools to 115 out of 210 in rural schools. Therefore, the conclusion may not be untenable that, whereas in the rural schools, the correlations tend to be zero, (with almost equal number of positive and negative correlations), in the urban school sample of children, less than one fourth of all the correlations are negative, and more than three-fourths of all the correlations are positive. Again, another interesting point is related to the sex groupings. Among urban boys only 16 correlations out of 115 are positive; this number jumps to 50 among boys of rural schools. Likewise, among urban females of all the three grades together 27 out of 105 correlations are negative, and this jumps to 65 among girls of the rural schools. In other words, there is some evidence, howsoever slender, that among boys, the number of positive correlations is

somewhat, but, definitely larger than among girls - but this advantage, is lost in the rural schools.

The proportion of positive to negative correlations, from grade to grade, when the factor of sex is equalized, appears to be strikingly same, 54 out of 140, in Grade I and II, and 50 out of 140, in Grade V.

The psychological implication of this exercise is not altogether unimportant: It seems that psychological variables like the intervening variables, and performance in the achievement tests and the mosaic test are correlated to a small extent - but its magnitude appears to go down from the urban school sample to the rural school sample. To the extent the same or similar psychological processes are brought into play in the performance of tests in language and mathematics, and the manipulation of the mosaic pieces to make some desired design, that is reflected in the low correlations. But, the environment provided by the urban homes and schools seem to give more strength to whatever inter-relationships that might be existing between these two sets of psychological variables. The environment prevailing in the rural homes and schools seem to weaken such inter-dependence, which is at best very slight.

Some of the irregular fluctuations in the signs and the magnitudes of these correlations are undoubtedly due to sampling errors. These could be reduced greatly by combining smaller groups to form larger groups, though more heterogeneous with respect to one factor, usually sex. The correlations for the same sets of variables, for both male and female subjects of the same grade, in different locations, urban and rural have been computed and shown in Table 15-34.

The stablilization of the correlation values that is expected, seems to have accrued to an appreciable extent, by increasing sample size. In Grade I, urban schools, for the combined boys and girls samples, we note that (i) the variable 'time taken' correlates positively with all the

Table 15 - 34.

Product-moment correlations between Mosaic Test Variables and Intervening and Achievement Test Variables for subjects of all three grades of Urban and Rural Schools.

Intervening and Achievement Test.	URBAN Schools Mosaic Test Variables: Time taken	No. of pieces	Sub-design	Area	Rating Total	RURAL Schools Mosaic Test Variables: Time taken	No. of pieces.	Sub-design	Area	Rating Total
	1	2	3	4	5	1	2	3	4	5
Grade I M+F	N = 108					N = 96				
1. Mental age	131	175	-075	151	273^{xx}	-103	-202^{x}	-124	-238^{x}	138
2. I.Q.	166	164	-068	137	283^{xx}	-046	-173	-144	-197	043
3. Soc. Mat.	-025	086	037	107	120	103	080	048	082	074
4. Moral Relat.	097	100	-010	063	099	-062	-127	-089	-152	094
5. Sociom. Ind.	196^{x}	113	037	154	144	230^{x}	001	085	011	099
6. Lang. Ach. Tot.	326^{xx}	317^{xx}	-191	245^{x}	278^{xx}	-105	-154	-120	-173	254^{x}
7. Maths. Ach.	256^{xx}	242^{x}	-129	174	325^{xx}	-031	-118	-146	-166	321^{xx}
Grade II M+F	N = 96					N = 92				
1. Mental Age	215^{x}	226^{x}	-055	094^{x}	254	002	-014	006	-056	062
2. I.Q.	222^{x}	233^{x}	-027	097	255	035	-027	011	-075	073
3. Soc. Mat.	012	-043	036	027	-021	-037	211	080	170	023
4. Moral Relat.	-013	131	-028	217^{x}	220^{x}	-067	007	-026	043	-108
5. Sociom. Ind.	002	001	-063	-030	-021	081	176	-091	151	-046
6. Lang. Ach. tot.	266^{xx}	305^{xx}	-160	254^{x}	408^{xx}	067	-054	065	-102	060
7. Maths. Ach.	137	096	-092	117	360^{xx}	094	-179	-052	-170	-029
Grade V M+F	N = 97					N = 114				
1. Mental Age	240^{x}	231^{x}	-020	205^{x}	355^{xx}	151	-045	-110	-056	-042
2. I.Q.	215^{x}	215^{x}	024	204^{x}	346^{xx}	158	-037	-133	-066	-004
3. Soc. Mat.	026	-010	097	013	146	069	-001	003	-050	-073
4. Moral Rel.	261^{xx}	259^{xx}	152	234^{x}	072	-044	036	031	130	036
5. Sociom. Ind.	-033	-098	054	061	142	-033	-091	-059	-083	018
6. Lang. Ach. tot	200^{x}	194^{x}	073	188^{x}	254^{xx}	011	003	-026	-017	036
7. Maths. Ach.	321^{xx}	189^{x}	043^{x}	203^{xx}	421	005	015	-040	-016	-041

^{x} $p < .05$; ^{xx} $p < .01$.

intervening and achievement test variablos, save one - viz. 'social maturity', ~~with which the~~ correlation is negative. Three of the correlations are significant .196 with 'sociometric status' ($p < .05$), .326 with 'language achievement' ($p < .01$) and .256 with 'mathematics achievement' ($p < .01$). The next mosaic test variable 'total number of pieces used' correlates positively with all the 7 intervening and achievement test variables - two of the correlations being significant beyond .05 level. The third mosaic test variable, 'number of subdesigns' usually correlate negatively with the intervening and achievement test variables - 5 of the correlations are negative out of seven. Then both 'area' and 'Rating-Total' correlate positively with all the seven intervening and achievement test variables, two with the former, and four with the latter being significant beyond .05 level.

In Grade II, for the combined boys and girls sample, the situation is somewhat similar - only the correlation values have generally dwindled in size, and the number of negative correlations has increased. Language achievement and mathematics achievement both correlate positively with all the mosaic test variables, with the exception of 'number of sub-designs'. The correlation of the two achievement tests with 'rating - total' is moderately high, .408, and .360, both significant well beyond .01 level.

In the next stage, we may combine samples from urban and rural schools, but keep the groups homogenous with respect to sex, and age-grade. The correlations between the intervening and achievement test variables on one hand and the selected mosaic test variables on the other hand, are shown in Table 15 - 35.

Let us look into the correlation coefficients from group by group, in a systematic fashion.

In the male group of Grade I, most of the correlations are low, with quite a few negative correlations. Among the 35 coefficient correlations is the matrix, 8 are

Table 15 - 35.

Product-moment correlations between Mosaic Test variables and Intervening and Achievement Test Variables for subjects of three grades of the same sex pooled over Urban and Rural schools together.

Intervening and Achievement Test	MALE Mosaic Test Variables					FEMALE Mosaic Test Variables.				
	Time taken	No.of pieces.	Sub-design	Area	Rating Total	Time taken	No.of pieces	Sub-design	Area	Rating Total
	1	2	3	4	5	1	2	3	4	5
Grade I U+R		N = 127					N = 77			
1.Mental age	052	017	-89	-034	224**	-082	041	-072	-026	189
2.I.Q.	074	000	-113	-043	201*	-010	076	-068	014	181
3.Soc. Mat.	-132	027	094	010	089	-006	102	009	117	082
4.Moral Relat.	094	082	-015	068	105	192	-046	-190	-087	149
5.Sociom.Ind.	+131	029	050	028	127	378**	154	044	291*	152
6.LangAch.Tot.	251**	164	-098	092	309**	181	135	-177	117	192
7.Maths.Ach.	263**	161	-169	091	349**	150	059	-116	020	316**
Grade II U+R		N = 123					N = 65			
1.Mental Age	109	166	-047	043	174	111	051	107	029	181
2.I.Q.	119	153	-030	052	172	095	045	104	025	176
3.Soc. Mat.	024	-050	129	-017	033	-211	047	-014	069	-105
4.Moral Rel.	080	229*	061	264**	002	-218	-147	-193	-071	186
5.Sociom.S.I.	038	-034	-014	-058	034	-008	190	-196	175	-180
6.Lang.Ach.Tot	258**	301**	021	234**	281**	234	031	-157	086	282**
7.Maths.Ach.	231*	115	-039	116	239**	-074	-197	-117	-134	189
Grade V U + R		N = 148					N = 63			
1. Mental age	165*	107	-080	156	129	246	084	-125	-114	239
2.I.Q.	131	084	-096	126	139	264*	098	-102	-086	250*
3.Soc.Mat.	010	-052	037	-082	019	034	054	-001	082	052
4.Moral Rel.	095	129	-022	131	066	402**	264*	102	308*	186
5.Sociom.St.Ind	-019	028	-023	-012	031	-007	001	-066	005	302*
6.Lang.Ach.Tot	138	122	016	100	116	177	138	017	082	405**
7.Maths.Ach.	204*	178*	-025	142	169*	148	-047	-061	-051	258*

*p < .05; ** p < .01.

negative; among the 27 positive correlations, 6 are statistically significant. It is noteworthy, that, among the mosaic test variables; 'number of pieces' and 'Total - Rating' have all correlations with the 7 intervening and achievement variables positive - the last variable having 4 of them statistically significant. A third mosaic test variable, 'time taken' has one correlation of negative sign (with 'social maturity), but two of its correlations with 'language achievement-total' and 'mathematics achievement' are significant beyond .01 level. In the female group, which is much smaller in size (N=77, compared to N=125 for the males of Grade I), the coefficients of correlation are generally smaller, and the number of negative correlations is smaller. Among 35 coefficients, 11 are negative in sign. Among the remaining 24, only 3 reach significance at .05 level or better. What is noteworthy is the fact that as in the male group, the mosaic test variable 'total rating' has all its correlation coefficients of positive sign, and the variable 'number of pieces' has only one out of 7 correlations which is negative in sign.

In Grade II, male group, the situation is not very different. Among the 35 correlation coefficients in the matrix, 8 are negative in sign; of the remaining 27 positive coefficients, 8 reach significance at .05 level or better. As in the male sample of Grade I, the mosaic test variable 'rating total' has all its correlations of positive sign, so also the other variable 'time taken'. 'Number of pieces' has two of its correlations with negative sign.

The female sample of Grade II had only 65 subjects in it. Here we find that out of 35 correlation coefficients, no less than 15 are of negative sign. Of the remaining 20 positively signed coefficients, only one ('language achievement total' with 'rating total') reaches significance at .01 level.

The male sample of Grade V is quite large (N=149)

Here we find that out of 35 correlation coefficients, 9 have negative sign. Of the remaining 26 positively signed coefficients, only 4 reach significance at .05 level. Here too we note that, the same mosaic test variable 'total subjective rating' has all of its 7 correlations with pesitive sign; again, both 'time taken' and 'total number of pieces used' have each six coefficients with positive sign.

In the female group of Grade V (N=63) we find, that 10 coefficients have negative sign. Of the remaining 25 coefficients, as may as 8 are significant at .05 or a few even .01 level. In this group too, 'Total rating' has all its 7 correlation coefficients with positive sign, 3 of which are significant at .05 level, and one at .01 level.

The overall trend in the disposition of the correlation coefficients can best be summarized if we look into the number of correlations which are negative in each of six matrices shown in Table 15-35. This is shown in Table 15-36.

Table 15 - 36.

Number of correlations, between intervening and achievement variables on one hand and selected mosaic test variables on the other, that are negative, for each group homogenous with respect to age-grade and sex, but combined for urban and rural schools.

Grade	Male	Female	Total
I	8	11	19
II	8	15	23
V	9	10	19
I+II+V	25	36	51

But more meaningful may be to look into the number of positive correlations that are positive that each of the selected mosaic test variables has with the seven intervening and achievement variables. These are shown in Table 15-37.

Some interesting trends become quite clear from Table 15-37. It will be seen that, one of the 5 mosaic test variables 'subjective features rating-total' has no less than

Table 15 - 37.

Number of correlations that are positive in sign that each of the five selected mosaic test variables has with the seven intervening and achievement variables.

Mosaic Test Variable	Group											
	Grade I			Grade II			Grade V			All Grades		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1. Time taken	6	4	10	7	3	10	6	6	12	19	13	32
2. No. of pieces	7	6	13	5	5	10	6	6	12	18	17	35
3. No. of subdesigns.	2	2	4	3	2	5	2	2	4	7	6	13
4. Area covered	5	5	10	5	5	10	5	4	9	15	14	29
5. Total Rating	7	7	14	7	5	12	7	7	14	21	19	40
Total	27	24	51	27	20	47	26	25	51	80	69	149

40 correlations with positive sign out of 42. Not only that, out of these 40 positive correlates, 6 are significant beyond .05 level, and 7 are significant beyond .01 level. The significant correlates are usually with two achievement test variables, 'language achievement - total' and 'mathematics achievement'. The three other variables which fare increasingly worse, are 'number of pieces used', 'time taken' and 'area covered' in that order. 'Number of subdesigns' has the least number of positive correlations - only 13 out of 42.

This finding is of considerable scientific interest: 'subjective rating-total' correlating positively with all the intervening variables and the two achievement test. The correlation with the last two variables usually are quite moderately high, to reach significance at .01 level on 7 occasions, and at .05 level on 3 occasions, out of a total of 12 coefficients. Here we have something of considerable scientific interest : a projective test seems to have certain features which share psychological processes that underlie achievement in mathematics and language - belonging to the domain of cognitive learning.

This line of analysis can be pushed still further by having xx still larger groups, which will be homogenous with respect only to age-grade, but heterogenous with respect to both sex and location of schools. The corresponding correlation coefficients for the samples of the three age-grades are shown in Table 15-38.

It will be seen that further stabilization in the correlation coefficients has taken place due to the increase in the sample size. In Grade I sample (N=204), consisting of boys and girls of both rural and urban schools, 8 coefficients out of 35 are negative. Of the remaining 27 positively signed coefficients, 8 are significant at .05 level or .01 level. Further we note again that of the 5 mosaic test variables, two, viz., , 'number of pieces used' and 'Total rating' have all their correlations with the intervening

Table 15 - 38

Product-moment correlations between Mosaic Test Variables and Intervening and Achievement Test variables for subjects of the three grades of both the sexes from urban and rural schools pooled together

Intervening and Achievement Test Variables	MOSAIC TEST VARIABLES Time Taken	No.of pieces	Sub-designs	Area covered	Rating Total
GRADE I, M+F U+R N = 204					
1. Mental Age	015	036	-070	-015	203**
2. I.Q.	054	039	-081	-010	184**
3. Social Maturity	-063	071	064	065	078
4. Moral Relativism	132	030	-091	016	122
5. Sociom.Stat.Index	218**	075	048	108	134
6. Lang.Ach.Total	212**	143*	-139*	089	260**
7. Maths.Ach.	216**	118	-146*	064	336**
Grade II, M+F U+R N=188					
1. Mental Age	113	115	-004	036	164**
2. I.Q.	116	104	012	027	160**
3. Social Maturity	-016	-005	078	010	-033
4. Moral Relativism	-024	087	-026	168**	095
5. Sociom.Stat.Index	017	070	-073	014	-044
6. Lang.Ach.Total	235**	199**	-041	190**	293**
7. Maths.Ach.	130	-003	-067	050	229**
Grade V, M+F, U+R N=211					
1. Mental Age	203**	099	-084	069	152**
2. I.Q.	184**	090	-89	059	161**
3. Social Maturity	026	-013	029	-024	026
4. Moral Relativism	185**	176*	008	192**	053
5. Sociom.Stat.Index	-011	-017	-029	-006	088
6. Lang.Ach.Total	163*	124	019	098	168*
7. Maths. Ach.	205**	-111	-028	091	184**

* $p < .05$; ** $p < .01$

achievement variables with positive sign. The variable 'time taken' has one out of its seven correlations with negative sign. 'Total rating' has four of its correlation significant at .01 level, and 'time taken' has 3 of its correlations significant at .01 level.

In Grade II (N=188), the situation is very similar. Out of 35 coefficients, 11 are negative; out of the 24 positively signed correlation coeffients, 8 are statistically significant at .01 level. In this group, the only mosaic test variable to have all its 7 correlations with positive sign in 'area covered'.

In Grade V, the same trend is seen. Out of the 35 coefficients of correlation, 9 are negatively signed. Of the 26 positive correlations, 11 reach significance at either .05 level or .01 level. In this group too, the mosaic test variable 'Total rating' has all its 7 correlations with positive sign, 3 being significant at .01 level, and one at .05 level. The mosaic test variable 'time taken' has no less than 5 of its correlations significant, 4 at .01 level, and one at .05 level.

But most importantly, we may note which intervening and achievement test variables correlate in which manner with the mosaic test variables. This is brought out nicely in Table 15-39.

It will at once be seen that there are 3 intervening variables, and two achievement variables, which have tended to have positive correlations with the mosaic tests in general. These are IQ, mental age, moral relativism, language achievement total, and mathematics achievement. Both social maturity and sociometric status index tend to have lesser number of positive correlations with the mosaic test variables. The difference between one grade to the next is only slight.

The above line of analysis seems to point out to one interesting finding of considerable consistency - so far

Table 15 – 39

The number of positive correlations that each of the 7 intervening and achievement variable has with the 5 mosaic test variables in the three different age-grade groups.

Intervening and Achievement variables	Grade I Signi-ficant	Grade I Non-Sig-nificant	Grade I To-tal	Grade II Signi-ficant	Grade II Non-sig-nificant	Grade II To-tal	Grade V Signi-ficant	Grade V Non-sig-nificant	Grade V Total	Total Signi-ficant	Total Non-sig-nificant	Total (out of 15)
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Mental Age	1	2	3	1	3	4	2	2	4	4	7	11
2. IQ	1	2	3	1	4	5	2	2	4	4	8	12
3. Social Metrix	0	4	4	0	2	2	0	3	3	0	9	9
4. Moral Relativism	0	4	4	1	2	3	3	2	5	4	8	12
5. Sociometric status Index	1	4	5	0	3	3	0	1	1	1	8	9
6. Language Achievement Test	3	1	4	4	0	4	2	3	5	9	4	13
7. Mathematics Achievement	2	2	4	1	2	3	2	2	4	5	6	11
All tests	8	19	27	8	16	24	11	15	26	27	50	77

as correlations between intervening and achievement variables on one hand and mosaic test variables on the other are concerned, the variation from one grade to another is slight, and not at all systematic. This being so, we may obtain greater range in the scores by combining the samples from the three grades together. The correlations obtained from such groupings are shown in Table 15-40.

It should be noted that from the above analysis correlation of mosaic test variables with the two achievement tests, have been excluded - because, these two tests were not identical in the three grades.

In the top part of Table 16-40, the correlations for male and female groups, as well as the two location groups have been shown separately.

First, let us note that in the urban, male sample of all the three age-grade subjects pooled together, out of 25 correlation coefficients, 4 are negative. Out of the remaining 21 positive correlations, 10 reach statistical significance, 9 of them at .01 level and one at .05 level. 'Time taken', 'number of pieces', and 'rating-total' have all their correlations with positive sign. In the rural, male sample, however, out of 25 correlations, 8 are with negative sign. Out of the remainining 17 positively signed coefficients, 8 reach statistical significance, 7 at .01 level, and one at .05 level.

Oet us see what is the picture in the female groups. In the female, urban sample, out of 25 coefficients, 5 have negative sign. Of the remaining 20 positive correlations, 12 reach statistical significance, 10 at .01 level, and 2 at .05 level. In the rural, female sample, out of 25 coefficients, 11 are negatively signed. Out of 14 positive coefficients, only 5 reach significance, 4 at .01 level and one at .05 level.

The above facts are best summarized in Table 15-41, where the number of positive correlations that each of the 5 intervening variables have with the 5 mosaic

Table 15 - 40

Product-moment correlations between Intervening variables and Mosaic Test Variables subjects of urban schools pooled over the grades and rural school pooled over three grades, for male and females and males and females combined.

Intervening and Achievement Test	URBAN – MOSAIC TEST VARIABLES					RURAL				
	Time taken	No.of pieces	Sub-desing	Area	Rating Total	Time taken	No.of pieces.	Sub-design	Area	Rating Total
	1	2	3	4	5	1	2	3	4	5
Male Grade I,+II+V	N = 188					N = 210				
1. Mental Age	342**	249**	067	063	542**	338**	163**	-068	101	292**
2. I.Q.	230**	190**	-033	074	415**	156**	069	-117	025	069
3. Social Mat.	096	071	040	061	119	-042	-077	074	-120	046
4. Moral Relat.	203**	183**	-020	131	242**	172**	197**	026	164*	189**
5. Sociom.St.Ind.	043	077	061	-017	202**	157*	-012	-035	-018	079
Female Grade I, II+V	N = 113					N = 92				
1. Mental Age	269**	278**	037	128	421**	252*	-067	-061	-189	395**
2. I.Q.	258**	279	-010	188*	300**	045	-159	-049	-277	168
3. Social Mat.	-080	-050	064	-020	168	190	314**	-070	323**	-076
4. Moral Relat.	307**	257**	158	202**	275**	074	-152	-217	-126	224*
5. Sociom.St.Ind.	166	138	-086	186*	119	088	133	-046	122	171
M+F GradeI,II+V	N = 301					N = 302				
1. Mental Age	331**	268**	-021	089	494**	320**	056	-058	-004	316**
2. I.Q.	252**	234**	-015	114*	367**	135**	-037	-091	-087	098
3. Social Mat.	046	028	054	127*	136*	057	079	034	048	003
4. Moral Relat.	230**	209**	048	148**	254**	141*	060	-034	062	200**
5. Sociom.St.Ind.	075	096	014	029	176	136*	041	-038	029	107
M+F Grade I,II,V	Urban + Rural N = 603									
1. Mental Age	295**	170**	-034	045	405**					
2. I.Q.	182**	109**	-053	030	236**					
3. Social Mat.	009	028	054	020	067					
4. Moral Relat.	213**	158**	-018	128**	237**					
5. Sociom.St.Ind.	096**	074	-022	030	145**					

* $p < .05$; ** $p < .01$.

Table 15 -41

Number of correlations that are positive, significant and non-significant, that each of the five intervening variables has with the five mosaic test variables.

Intervening Test variables	URBAN Male significant	Non-significant	Total	URBAN Female significant	Non-significant	Total	RURAL Male significant	Non-significant	Total	RURAL Female significant	Non-significant	Total	TOTAL MALE	FEMALE	Total
1. Mental age	3	1	4	3	2	5	3	1	4	2	0	3	11	4	15
2. Sex	3	1	4	4	0	4	1	3	4	0	2	2	8	6	14
3. Social Maturity	0	5	5	0	2	2	0	2	2	2	1	3	2	10	12
4. Moral relat.	3	1	4	4	1	5	4	1	5	1	1	2	12	4	16
5. Socio-matric, Stat. Index	1	3	4	1	3	4	1	1	2	0	4	4	3	11	14
All five test	10	11	21	12	8	20	9	8	17	5	8	14	36	35	71

test variables are shown.

The inter-variable differences in the number of positive correlations or their significance level appears to be slight. But, a distinct trend is to be seen - as regards the impact of the factor of location: in the urban groups, whether male or female, the number of positive correlations appear to be slightly but definitely greater than that in a rural groups, male and female both.

Now we can turn to the consideration of the correlations obtained from the largest, and necessarily most heterogenous group - consisting of subjects of the three grades, and two sexes together - but homogenous with respect to location of schools - as this factor has proved its importance. These correlations are shown in the lower part of table 15-40.

What we have been trying to a catch hold of, appears to have come under the grip. We now find, that in the urban sample among the two sexes, male and female, and arriving the three grades, there are only two correlations coefficients out of 25, that are negative. Again, out of the remaining 23 positive correlations, no less than 14 reach statistical significance, 11 at .01 level, and 3 at .05 level. The situtation in the entire rural sample is altogether different. Here, out of the 25 coefficients, no less than 7 are negative. Out of the 18 coefficients, no less than 7 are negative. Out of the 18 positive correlations, only 6 reach statistical significance, 4 at .01 level, and 2 at .05 level.

Variable-wise, in the urban sample, only 'area covered' has 2 negative correlations (with 'mental age' and IQ); in the rural sample, only 'time taken' and 'total rating' have all their correlations with positive sign.

These trends are further stabilized, when the entire sample of 603 is considered. In this group, which

is most hetegrogenous, with respect to age-grade, sex and location of schools, stability is established with a fair degree, in the correlation coefficients. We find that out of 25 coefficients of correlation, only 4 are negative and all of these are with the single variable 'number of sub-designs'. All the other 4 mosaic test variables have correlations with the intervening variables that are positive in sign. Out of those 21 positively signed correlations, no less than 12 reach statistical significance, all of them at .01 level. Among the intervening variables, only one variable, 'social maturity' has uniformly poor correlation with the mosaic test variables - none of which reach significance at even .05 level.

Among the mosaic test variables, 'rating total' has 4 correlations out of which one is significant at .01 level; the same is the case with the mosaic test variable, 'time taken' but here the value of the coefficients is somewhat lower. Next comes, 'number of pieces' which has three of its correlations significant at .01 level. Lastly 'area covered' has only one correlation which is significant at .01 level. 'Number of subdesigns' has all the correlations with the intervening variables either low positive or low negative - none of these being significantly different from zero.

This entire section has established the fact that both subjective and objective features of the mosaic design appear to be intimately related to psychological processes tappped by the intervening variables studied in this investigation.

Chapter 10

Relationship between Independent variables and Intervening and Dependent variables

Let us recall that what we have named independent variables consist of two distinct sets of variables. One of these consists of factors dealing with house, family and socio-economic conditions from which the subject has been chosen. The other consists of those factors that deal with the school – its management, its organization and administration, and its academic and instructional equipments, in which the subject is studying. The former cluster can be called Family Background variables, and the latter cluster can be called the school variables. In this chapter we propose to find out how these two sets of variables are related with the intervening and dependent variables that have been included in the present study.

A. Inter-correlation between Family Background Variables and Intervening and Achievement Variables

Among the family background variables, there are 6 variables which could be correlated in a straight forward way, with the intervening and achievement variables. These are : Father's education, Mother's occupation, Income and LinSES scores.
The last one, LinSES, is a linear composite of the first 5 variables to which has been added the score for another variable, viz. caste.

The LinSES variable scores for all practical purposes, are similar to 'socio-economic status scores' obtainable from administration of special scales.

In the present study, there is a large number of intervening and achievement variables. We have seen that some of these variables are highly correlated with each other. We can select most representative variables in order to economize on space, and get more meaning out of the mass of data. So the following variables have been chosen for purpose of describing the nature of inter-relationship between the two sets of variables :

Intervening variables:

1. Intelligence quotient
2. Social maturity
3. Moral relativism
4. Socio-metric status Index

Dependent (Achievement variables)

5. Language achievement – total
6. Mathematical achievement
7. Mosaic test – total number of piece used
8. Mosaic test – Area
9. Rating – Total

Thus for each group of subjects, we will have correlation between each of the 6 family background variables representing the Independent variables, and 9 variables listed above, representing a selection of the more important intervening and achievement variables.

The correlations between these two sets of variables for different groups of subjects belonging to Grade I are shown in Table 16-1.

Table 16-1

Product-moment correlations between Background variables on one hand and Intervening, Achievement tests and Mosaic Test variables on the other for all subjects of Grade I

Background Variable & Group	N		1 I.Q.	2 Social Mat.	3 Moral Relat.	4 Sociom Index	5 Lang. total	6 Maths total	7 No. of pieces	8 Area	9 Rating total
			Intervening, Achievement & Mosaic Test Variables								
1. Father's Education	66	UM	529*	361*	282@	253@	532*	591*	063	-014	404*
	42	UF	202	097	244	215	170	286	303@	187	279
	61	RM	-074	065	143	323*	258@	254@	086	129	182
	35	RF	-105	-606*	201	354@	270	140	-126	-090	-085
2. Mother's Education	66	UM	377*	257@	266@	041	423*	414*	000	-062	333*
	42	UF	329@	127	265	099	082	320@	069	053	303@
	61	RM	-111	186	210	-029	202	225	055	041	092
	35	RF	029	-157	160	175	348@	130	-168	-172	077
3. Father's Occupation	66	UM	464*	260@	268@	098	659*	753*	209	175	408*
	42	UF	229	079	292	313@	216	341@	260	192	206
	61	RM	-147	-016	182	120	297@	298@	-081	049	083
	35	RF	075	-169	314	133	017	273	079	-063	-085
4. Mother's Occupation	66	UM	059	-173	-045	043	057	-083	-220	-094	-133
	42	UF	271	-071	303@	-095	-003@	180	-029	-047	-020
	61	RM	035	145	045	-169	-106	-014	015	-015	002
	35	RF	-163	171	-087	036	-084	-123	048	166	036
5. Income	66	UM	337*	248@	217	047	590*	668*	268@	186	234
	42	UF	262	145	353@	222	128	302	231	071	187
	61	RM	-128	-066	217	078	139	154	027	118	065
	35	RF	163	-398	156	241	140	273	-056	-230	120
6. LinSES, Score	66	UM	518*	328*	291*	132	663*	710*	138	070	401*
	42	UF	347@	137	355@	207	155	351@	241	-132	259
	61	RM	-183	034	248	114	263@	304*	027	113	188
	35	RF	018	-661	360@	331	389@	342@	-139	-245	-027

@ $p < .05$; * $p < .01$

In this table, correlations for 4 comparable homogenous groups are shown within the same box, for purposes of comparison. This will enable us to study the variation in the intercorrelation between the same pair of variables as the group characteristic is changed. Let us look into the correlations by taking each of the 6 family background variables in turn.

(1) Father's Education : This family background variable appears to be correlated positively with most of the 9 chosen intervening and achievement variables in all the 4 groups : urban male, urban female, rural male, and rural female. In the urban male group there is one negative correlation; in the urban female group, all correlations are positive; in the rural male group, there is one negative correlation; but in the rural female group, there are 5 negative correlations out of 9. Most of these coefficients are of moderate size, and few reach significance level even at .05 level.

(2) Mother's Education : Compared to the previous variable, Father's education, this variable correlates less positively with the intervening and achievement variables. But the group trends are similar. Thus, in the urban male group there is one negative correlation; in the urban female group, all correlations are positive; in the rural male group 2 correlations are negative; but in the rural female group, there are 3 negative correlations.

(3) Father's Occupation : Correlations between this variable and the nine variables comprising the intervening and achievement variables are by and large, positive and moderately sized. Thus, only in rural male group, there are three coefficients with negative sign; the same is the number of negative correlations in the rural female group. Most of the correlations are with mosaic test variables or social maturity.

(4) Mother's Occupation : Correlations with this variable have tended to be smaller in value, clustering around zero, with quite a few negatively signed coefficients. Thus in the urban male group, there are 6 negative correlations out of 9; in the urban female group there are also 6 correlations with negative sign out of 9; in the rural male group the number of negative correlations is 4; in the rural female group also there are 4 negative correlations.

(5) Income : This variable has a large number of positively signed correlations with the nine intervening and dependent variables. There are no negative correlations in the urban male and urban female groups; in the rural male group there are two negative correlations, and in the rural female group there are 3 negative correlations.

(6) LinSES : This variable has also mostly positive correlations with the 9 variables in question. Thus in the urban male group, there is no negative correlations: in the urban female group there is one negative correlation; in the rural male group, there is just one negative correlation; in the rural female group there are 4 negative correlations.

In terms of the 9 intervening and dependent variables also, we may like to find out how many correlations are positive, and how many are negative, in the various groups.

(a) I.Q.: Out of 24 correlations with 6 variables each in 4 groups, we note that 7 are negative; of these 7 negative correlations, 5 are in the rural male group, and 2 in the rural female group. None of the correlations with this variable in the urban male or female group is negative. This is noteworthy.

(b) Social Maturity : This variable has no less than 9 negatively signed correlations out of 24 reported; only one of them is in the urban male group (with mother's occupation) and another in the urban female group (with again 'mother's occupation'); 2 of them are in the rural male group, and 5 in the rural female group.

(c) Moral Relavitism : This variable has only 2 negatively signed correlations, both with 'mothers occupation' – in the urban male, and rural female group. The rest of the 22 correlations are all positively signed.

(d) Sociometric Status Index : This variable has 3 negative correlations out of 24 reported: one with 'mothers education' in rural male group, two with 'mother's occupation' in urban female and rural male groups. The remaining 21 correlations are all positive.

(e) Langu. Achievement Total : This variable has only 2 negatively signed correlations out of 24 reported – both with 'mother's occupation' – in urban female, and rural male groups.

(f) Mathematics Achievement : This variable has only 3 negatively signed correlations – all with 'mother's occupation' – in urban male and rural male and female groups.

The size of the correlations with both the achievement test are moderately high.

(a) Mosaic Test : Total Number of Pieces Used : This variable has no less than 7 negatively signed correlations out of a total of 24. One is with 'father's education' in the rural female group; another is with 'mother's education' in the same group; a third one is with 'father's occupation' in the rural male group; two correlations are negative with 'mother's occupation' – in the urban male group, and urban female group; then there is one negative correlation with 'income' in the rural female group and one negative correlation with LinSES in the rural female group.

(b) Mosaic Test - Area Covered : This variable has no less than "negative correlations out of 24 reported - two with father's education (urban male, and rural female); two with mother's education (urban male and rural female), one with 'father's occupation' (rural female), 3 with 'mother's occupation' (urban male and female, and rural male), one with income (rural female), and 2 with LinSES scores (urban female, and rural female),

Mosaic Test - Rating Total : This variable has 5 negatively signed correlations - one with 'father's education' (rural female), one with 'father's occupation' (rural female) 2 with 'mother's occupation (urban male and female), and one with LinSES scores (rural female).

These correlations again can be overviewed in terms of each of the 6 family background variables - considering all the 4 small groups together. Then we note, that

(i) Father's Occupation has 3 negative correlations with the 4 intervening variable and 4 negative correlations with the 3 mosaic test variables - that is a total of 7 negative correlations out of 36 correlations reported for this variable;

(ii) Mother's Education has 3 negative correlations with the intervening variables, and 3 negative correlations with the mosaic test variables;

(iii) Father's Education has 3 negative correlations with the intervening variables, and 4 negative correlations with the mosaic test variables;

(iv) Mother's Occupation has 7 negative correlations with intervening variables, 6 negative correlations with achievement test variables, and 7 negative correlations with mosaic test variables - a total of 20 negative correlations out of a total of 36.

(v) Income has 3 negative correlations with intervening variables, and 2 negative correlations with mosaic test variables;

(vi) LinSES Score has 2 negative correlations with intervening variables and 4 negative correlations with mosaic test variables - a total of 6 negative correlations out of 36.

Thus it will be seen, that with the exception of 'mother's occupation' - the remaining 5 variables have more or less the same number of positive and negative correlations with the 9 intervening and dependent variables. This number varies from 5 to 7 - out of a total of 36 correlations reported for each variable.

Now, another comparison will be in order, among the 4 groups. Thus we note the following :

1. In the urban male group, there are only 8 negatively signed correlation coefficients out of a total of 54 correlations reported; two of them are with an intervening variable, and one with mathematics achievement; the remaining 5 are with mosaic test variables.

2. In the urban female group the number of negative correlations is 7 : 2 of them are with intervening variables, one with language achievement test, and 4 with mosaic test.

3. In the rural male group, the number of negative correlations is no less than 13. 8 of them are with intervening variables, 2 with achievement tests, and 3 with mosaic test variables.

4. In the rural female group, the number of negative correlations rises to 22 out of 54. Eight of them are with intervening variables, 2 with achievement tests, 13 are with the mosaic test variables.

We have discussed the trends of the inter-correlations in some detail, for grade I, to point out some systematic group trends related with particular variables. It may be pointed out here, that so far as the 4 intervening variables are concerned, by and large they have tended to correlate positively with the 6 family background variables. Thus out of 96 correlation coefficients reported, only 20 coefficients are negative, Out of the remaining 76 positive correlations, at least one-third reach significance at least at .05 level, if not better.

The two achievement tests fare still better: out of 48 correlations considered only 6 are negative. What is more, all of these 6 negative correlations are confined to only one variable viz 'mohter's occupation'. But more remarkable is the fact, that a substantial number (50%) of the 42 positive correlations is statistically significant. Among the 72 correlations with the 3 mosaic test variables reported 23 are negative. Even among the 49 correlations that are positive few reach the level of statistical significance.

Now we are in a position to look into the trend exhibited by correlations among these two sets of variables in the 4 different types of groups in Grade II. These are shown in Table 16-2.

Table 16-2

Product-moment correlations between Background Variables on one hand and Intervening, Achievement Tests and Mosaic Test Variables on the other for different groupings of Grade II

Background Variable and Group	N		1 I.Q.	2 Soc. Mat.	3 Moral Relat.	4 Sociom Index	5 Lang. Total	6 Maths Total	7 No. of pieces	8 Area Covered	9 Rating Total
			Intervening, Achievement & Mosaic Test Variables								
1. Father's Education	57	UM	203	097	225	-063	528^{xx}	257	395^{xx}	321^{x}	344^{xx}
	39	UF	162	013	104	089	403^{xx}	096	272	341^{x}	112
	66	RM	-148	089	.026	-085	347^{xx}	325^{xx}	-006	-014	-046
	26	RF	-034	419^{x}	263	402	125	252	051	125	-150
2. Mother's Education	57	UM	015	-103	212	-131	429^{xx}	287^{x}	372^{xx}	395^{xx}	241
	39	UF	-029	038	169	-005	311	102	060	122	155
	66	RM	000	000	000	000	000	000	000	000	000
	26	RF	142	087	226	460^{x}	153	160	-271	-191	065
3. Father's Occupation	57	UM	131	050	246	-148	411^{xx}	313^{xx}	358^{xx}	273^{x}	306^{x}
	39	UF	276	-167	246	021	559^{xx}	258	110	133	157
	66	RM	-106	075	016	042	091	179	-121	-191	-048
	26	RF	178	093	034	411^{x}	031	-153	-071	-054	126
4. Mother's Occupation	57	UM	-007	071	027	-020	226	156	-022	-012	012
	39	UF	085	233	215	-116	188	140	-040	107	128
	66	RM	160	168	271^{x}	054	-140	-085	076	085	-068
	26	RF	-031	001	-186	-053	-366	-249	-147	-141	-248
5. Income	57	UM	066	134	144	-039	371^{x}	266^{x}	264^{x}	282^{x}	330^{x}
	39	UF	301	-113	255	-040	407^{xx}	058	308	266	280
	66	RM	-041	133	-054	-088	123	094	-121	-107	-137
	26	RF	-015	094	124	167	-087	014	-048	-028	-109
6. LinSES Score	57	UM	124	010	257	-131	536^{xx}	294^{xx}	421^{xx}	365^{xx}	368^{xx}
	39	UF	171	-054	231	-006	495^{xx}	148	186	243	232
	66	RM	-161	142	-025	-050	265^{x}	273^{x}	-083	-105	-035
	26	RF	107	285	141	431^{x}	029	070	-134	-068	-059

x $p < .05$; xx $p < .01$

Even a cursory glance to Table 16-2 will show that there is a good deal og similarity of Table 16-1 for Grade I with this table, Briefly we can consider the correlations in terms of the different variables.

(1) <u>Father's Education</u> Among 36 correlations of this variable, 8 are negative - 4 with intervening variables, and 4 with mosaic test variables.

Further, these negative correlations have tended to be concentrated in the rural male and female groups only.

(2) <u>Mother's Education</u> Here we find that only 6 out of 34 correlations have negative sign - 4 with intervening variables, and 2 with mosaic test variables.

(3) Father's Occupation Here there are nine negatively signed coefficients, 3 with intervening variables, one with achievement tests, and 5 with mosaic test variables.

(4) Mother's Occupation With this variable, no less than 17 correlations are negative - 6 with intervening variables, 4 with achivement tests, and 7 with mosaic test variables.

(5) Income With this variable also, as many as 14 correlations are negative - 7 with intervening variables, 1 with achievement test, and 6 with mosaic test variables.

(6) LinSES Score With this variable, no less than 12 correlations are negative - 6 with intervening variables, and 6 with mosaic test variables.

We can look into these correlations again in term of the 9 variables comprising the intervening, achievement test and mosaic test variables.

(a) I.Q. : Among its 24 correlations reported, 9 are negative.

(b) Moral Relativism : There are only 3 correlations that are negatively signed with this variable out of 24 reported.

(c) Social Maturity : Likewise with this variable 4 correlations are negative.

(d) Socio-metric Status Index : No less than 14 out of 24 correlations reported are found to be negative with this variable.

(e) Language Achievement-Total: Only 3 correlations are seen to have negative sign with this variable.

(f) Mathematics Achievement : Here too we find that there are only 3 correlations which have negative sign, with this variable.

(g) Mosaic Test - Number of Pieces Used : No less than 11 correlations with this variable are negative.

(h) Mosaic Test - Area Covered : With this variable also, no less than 10 correlations are negative.

(i) Mosaic Test - Rating Total : 9 out of 24 correlations reported are found to be negative.

In terms of groups, we may note the following trends:

1. In the urban male group, 10 correlations out of the total of 54 are negative.
2. In the urban female group, 9 correlations out of the total of 54 are negative.

3. In the rural male group, no less than 24 out of 54 are native.

4. In the rural female group, again no less than 22 correlations out of 54 are negative.

Thus it is clear that the strength of positive relationship between family background variables on one hand and psychological and achievement variables on the other is much greater in the urban groups then in rural groups.

We can now turn to a consideration of the correlation between the same two sets of variables for the different groups in Grade V. These are shown in Table 16-3.

Table 16-3

Product-moment correlations between Background Variables on one hand, and Intervening, Achievement tests and Mosaic test variables on the other for different groups of Grade V subjects

Background Variable & Group		1 I.Q.	2 Soc. Mat.	3 Moral Relat.	4 Sociom. Index	5 Lang. Total	6 Maths Total	7 No. of pieces	8 Area cov.	9 Rating To[illegible]
		Intervening, Achievement & Mosaic Test Variables								
1. Father's Education	65 UM	331^{xx}	-168	436^{xx}	005	460^{xx}	305^{x}	007	029	146
	32 UF	231	-299	424^{x}	-061	245	292	241	138	010
	83 RM	-028	-091	130	109	285^{xx}	136	284^{xx}	168	-130
	31 RF	-077	425^{x}	-055	049	107	002	008	-085	-177
2. Mother's Education	65 UM	289^{x}	-324^{xx}	409^{xx}	-092	331^{xx}	413^{xx}	038	098	391^{xx}
	32 UF	144	-296	485^{xx}	-179	262	168	196	204	-140
	83 RM	183	006	141	-063	-035	-067	015	081	-052
	31 RF	445^{x}	322	-166	-095	-053	-138	412^{x}	292	076
3. Father's Occupation	65 UM	275^{x}	-163	534^{xx}	001	519^{xx}	487^{xx}	-010	050	066
	32 UF	186	-361^{x}	438^{x}	-243	202	169	290	274	032
	83 RM	085	-193	-001	-028	026	090	066	065	-046
	31 RF	201	058	-084	214	375^{x}	176	025	-094	242
4. Mother's Occupation	65 UM	121	-305^{x}	125	018	111	-018	-138	-106	159
	32 UF	173	-123	255	-083	189	099	085	027	120
	83 RM	174	-224	-137	-014	041	-033	116	245^{x}	108
	31 RF	-224	160	-178	-141	-034	-329	110	171	017
5. Income	65 UM	267^{x}	-126	399^{xx}	-120	369^{xx}	328^{xx}	-070	010	032
	32 UF	286	-262	435^{x}	-191	093	130	084	087	044
	83 RM	-131	-075	207	019	071	093	098	083	-028
	31 RF	028	131	-071	187	209	173	-079	-226	130
6. LinSES Score	65 UM	365^{xx}	-217	532^{xx}	-059	490^{xx}	-429	-010	037	169
	32 UF	277	-341	542^{xx}	-147	289	255	269	222	038
	83 RM	018	-121	198	028	221	129	244	203	-113
	31 RF	177	228	-136	157	284	185	-001	-184	067

x $p < .05$; xx $p < .01$

A perusal of the correlations shown in table 16-3 seem to point out that the number of positive correlations has increased somewhat. But a variable-wise count may be more illuminating which follows :

(1) Father's Education : Out of the 31 correlations presented here, 10 are found to be negative - 7 with intervening variables and 3 with mosaic test variables.

(2) Mother's Education : With this variable out of 36 correlations presented here, 13 are found to be negative - 7 with intervening variables, 4 with achievement tests, and 2 with mosaic test variables.

(3) Father's Occupation : With this variable out of 36 correlations, 10 are found to be negative - 7 with intervening variables, and 3 with mosaic test variables.

(4) Mother's Occupation : With this variable out of 36 correlations, 15 are found to be negative - 9 with intervening variables, 4 with achievement tests, and 2 with mosaic test variables.

(5) Income : With this variable, out of a total of 36 correlations 11 are found to have negative sign - 7 with intervening variables and 4 with mosaic test variables.

(6) LinSES Score : With this variable, out of 36 correlations, 10 are found to be negative - 6 with intervening variables, and 4 with mosaic test variables.

We may look into the same correlations but in terms of the nine variables comprizing intervening, achivement and mosaic test variables.

(a) I.Q. : We note that only 4 out of 24 correlations are negative in sign.

(b) Social Maturity : With this variable, 17 out of 24 correlations are negative.

(c) Moral Relativism : With this variable, 8 out of 24 correlations are negative.

(d) Socio-metric Status Index : With this variable no less than 13 out of the total of 24 correlations are negative.

(e) Language Achievement - Total : We note that only 3 out of the total of 24 correlations are negative.

(f) Mathematics Achievement : With this variable likewise 5 out of 24 correlations are negative.

(g) Mosaic Test - Total No. of pieces : With this variable also 5 out of the 24 correlations reported are negative.

(h) Mosaic Test - Area Covered : With this variable too 5 out of the 24 correlations reported are negative.

(i) Mosaic Test - Rating Total : With this variable, 7 out of 24 correlations reported are negative.

In terms of the 4 different groups we may note the following :

1. In the urban male group, 15 out of 54 correlations are negative.

2. In the urban female group, 13 out of 54 correlations are negative.

3. In the rural male group, 20 out of 54 correlations are negative.

4. In the rural female group, 21 out of 54 correlations are negative.

If all these tables, representing age-grade groups are considered together, then only any systematic trend will become more clear. This is done by finding out how many of the correlation coefficients are statistically significant, at least at .05 level, and are also positive, for each type of group by location, by sex and by age-grade. In this count, only positive correlations that have reached significance level at some acceptable level are included. Otherwise, a large number of correlations that are positive but are not significantly different from zero, may give a wrong picture.

The distribution of positive correlations that are significant at least at .05 level, for three different types of groupings, is shown in Table 16-4.

Table 16-4

Number of correlations, between family background variables on one hand and nine intervening and achievement variables, that are positive and significant at least at .05 level

Family background variable	Urban Male	Urban Female	Rural Male	Rural Fem.	All M.	All F.	Total	Grade I	Grade II	Grade V	All grades I+II+V	Total positive Correl.
1. Father's Educ.	15	4	7	4	22	8	30	12	10	8	30	84
2. Mother's Educ.	15	4	0	4	15	8	23	10	5	8	23	83
3. Father's Occup.	15	4	2	2	17	6	23	10	7	6	23	84
4. Mother's Occup.	0	1	2	0	2	1	3	1	1	1	3	71
5. Income	14	3	0	0	14	3	17	6	6	5	17	78
6. LinSES	15	5	6	3	21	8	29	14	8	7	29	80
Total	74	21	17	13	91	34	125	53	37	35	125	480

* Both significant and non-significant.

A few points have to be kept in mind for a proper interpretation of the summary presented in Table 16-4. First, in each row the total number of correlation coefficients is 108. Out of this total of 108 coefficients, the total number of coefficients that are positive, is given in the last column. It is noteworthy that the maximum number of positive variables, Father's Education and Father's Occupation; Mother's Education comes next with 83 positive correlation coefficients, followed by LinSES score (80 positive correlations) and Income (with 78 positive correlations), Mother's occupation coming last with 73 positive correlations. On the basis of chance alone we would expect 54 coefficients out of 108 to be positively signed. But, it is clear that there is a significant preponderance of positive correlations over negative correlations for all of the 6 family background variables. Next, we note that, out of these positive correlations some reach significance at least at .05 level, or better. On this basis, Father's education has no less than 30 significant positive correlations; next comes LinSES score, which has 29 positive correlations. The percentage is somewhat more favourable for LinSES - 36.2% compared to 35.7% of positive correlations being statistically significant for LinSES score. Mother's Education, Father's Occupation and Income follow in that order with 23, 23, and 17 positive correlations respectively (27.7% 27.4% and 21.8%), reaching statistically significant level. Let us note, that 'Mother's occupation' comes off very poorly, with only 3 positive correlations out of 71 reaching level of statistical significance.

Next we may note that the number of significant positive correlations is larger in the urban groups than in the rural groups - 95 in the urban groups compared to 30 in the rural groups. Again, the number of significant positive correlations is much larger in the male samples - (91) - compared to that in the female samples - (34). Lastly, it appears that in Grade I, the number of significant positive correlations is relatively larger than in either Grade II or Grade V.

The general conclusion is then easily reached that as an independent variable, LinSES score, which is a composite of all the separate family background variables, is the best predictor for intervening and achievement variables.

Before we pass on to the next section, we may like to briefly consider whether any stabilization in the correlation coefficients in terms of their size and sign is effected by collapsing very small samples into somewhat larger ones. This can be done in various ways, by collapsing along location, sex or grade, or even across pairs of such background variables, or by collapsing all the three variables together. Only one illustration will be shown - by collapsing the variable of sex. The

correlations of each of the six family background variables with the nine intervening and achievement variables, for Grade I are shown in Table 16-5.

Table 16-5

Product-moment correlations between Background variables on one hand and Intervening, Achievement Tests and Mosaic test variables on the other, for all Grade I subjects pooled together

Background and group variable	N		1 I.Q.	2 Soc. Mat.	3 Moral Relat.	4 Sociom. Index	5 Lang. Total	6 Maths Achv.	7 No. of pieces	8 Area covd.	9 Total Rating
1. Father's	108	UMF	405xx	247x	268x	237x	371xx	461xx	166	068	350xx
Education	96	RMF	-186	-307xx	196	257x	248x	155	016	058	044
2. Mothers	108	UMF	346xx	187	261xx	064	278xx	375xx	026	-019	321xx
Education	96	RMF	-087	-042	199	037	278xx	154	-053	-038	074
3. Father's	108	UMF	392xx	199x	280xx	171	475xx	606xx	233x	188	328xx
Occupation	--	RMF									
4. Mother's Occupation	108	UMF	121	-149	122	-029	059	072	-126	-144	-052
5. Income	108	UMF	-327xx	234x	277xx	106	385xx	522xx	268xx	166	206x
	96	RMF	-072	243x	207x	108x	141	187	005	015	080
6. LinSES	108	UMF	446xx	241x	317xx	161	438xx	563xx	183	098	339xx
Score	96	RMF	-216x	-268xx	297xx	120	283xx	258xx	-001	035	063

xx P < .01; x P < .05

Mother's education, in the urban sample, has 8 positively signed correlations coefficients out of which 6 are significant at least at .05 level; but in the rural sample, only 5 correlations are positive, one of which only is significant at .05 level.

Father's occupation in the urban sample, has all of its nine correlations with positive sign, 8 of which are significant at least at .05 level. But Mother's occupation, in the urban sample, has only 4 positive correlations, none of which are significant.

Income in the urban sample, has also all of its 9 correlations with positive sign, 7 of which are significant at .05 level or both. But in the rural sample, only 7 correlations are positive, only one of which is statistically significant. The composite LinSES score in the urban sample has all of its 9 correlation with positive sign, 7 of which are significant at .05 level or both. In the rural sample, only six out of the 9 correlations are positive, three of which are statistically significant.

The corrolations for the same set of variables for urban and rural samples of both the ~~.../f~~ grade II are shown in Table 16-6.

Table 16-6

Product-moment correlations between Background variables on one hand and Intervening, Achievement Tests and Mosaic Test variables on the other for all Grade II subjects pooled together

Background and Group variable	N		1 I.Q.	2 Social Mat.	3 Moral relat.	4 Sociom. Index	5 Lang. Total	6 Maths Ach.	7 No. of pieces	8 Area Cov.	9 Rating Total
1. Father's Education	96	UMF	162	040	228^{x}	018	511^{xx}	218^{x}	320^{xx}	282^{xx}	258^{x}
	92	RMF	-145	199	135	105	281^{xx}	311^{xx}	084	097	-047
2. Mother's Education	96	UMF	-028	-036	247^{x}	-045	413^{xx}	215^{x}	199	248^{x}	214^{x}
	92	RMF	010	100	202^{x}	335^{xx}	064	104	-068	-033	070
3. Father's Occupation	96	UMF	179	-068	263^{xx}	-067	483^{xx}	299^{xx}	248^{x}	211	242^{x}
	92	RMF	(Result not available from the computer)								
4. Mother's Occupation	96	UMF	032	152	093	-061	193	141	-026	019	059
	92	RMF	(Result not available from the Computer)								
5. Income	96	UMF	149	-015	236^{x}	-023	414^{xx}	186	259^{x}	231^{x}	315^{xx}
	92	RMF	-066	147	054	043	066	091	004	007	097
6. LinSES Score	96	UMR	116	-035	296^{xx}	-056	551^{xx}	256^{x}	300^{xx}	286^{xx}	320^{xx}
	92	RMF	-124	213^{x}	102	168	179	223^{x}	025	020	-003

x $p < .05$; xx $p < .01$.

Here too, some stabilization has been effected in the matter of signs of the correlations. Father's education, has now 6 significant correlations out of all 9 positively signed coefficients, in the urban group. In the rural sample, of 7 positive correlations with positive sign, only two are statistically significant.

Mother's education, in the urban sample has 6 positive correlations, 5 of which are significant, but in the rural sample, only one is significant out of 7 positive correlations.

In the urban group, Father's occupation, has 6 significant correlations out of 8 that are positive. But Mother's occupation, in the urban sample, has 7 correlations that are positive, but none reaches significance at even .C5 level.

In the urban group, Income has 7 positive correlations, 5 of which are significant; in the rural group, 7 are positive, but no one is significant.

In the urban group, LinSES score, has 7 positive correlations, 6 of which are significant; in the rural group, 7 are positive; but only 2 out of them are significant.

We can now turn to a consideration of the correlations between the same set of variable, for urban and rural samples, in which both sexes have been combined in Grade V., These are shown in Table 16-7.

Table 16-7

Product-moment correlations between background variables on one hand and Intervening, Achievement Tests and Mosaic Test Variables on the other, for all Grade V subjects pooled together

Background and Group variable	N		Intervening, Achievement and Mosaic Test Variables								
			1 I.Q.	2 Social Mat.	3 Moral Relat.	4 Sociom. Index	5 Lang. Total	6 Maths Ach.	7 No. of pieces used	8 Area Cov.	9 Rating Total
1. Father's	97	UMF	273^{xx}	-100	422^{xx}	-017	384^{xx}	290^{xx}	088	060	104
Education	114	RMF	-052	040	075	093	229^{x}	100	216^{x}	108	-137
2. Mother's	97	UMF	218^{x}	-300^{xx}	426^{xx}	-116	296^{xx}	324^{xx}	091	129	229^{x}
Education	114	RMF	221^{x}	076	089	-065	-020	-067	081	113	-035
3. Father's	97	UMF	(Result not received from the computer)								
Occupation	114	RMF									
4. Mother's	97	UMF	(Result not received from the computer)								
Occupation	114	RMF									
5. Income	97	UMF	240^{x}	-138	392^{xx}	-143	278^{xx}	259^{x}	-029	022	034
	114	RMF	-082	000	096	070	092	097	034	-027	072
6. LinSES	97	UMF	267^{xx}	-225^{x}	516^{xx}	-088	404^{xx}	352^{xx}	082	090	127
Score	114	RMF	041	-022	091	057	207^{x}	121	176	096	-067

x $p < .05$; xx $p < .01$.

Here, we find that Father's education, in the urban group, has 7 positive correlations, only 4 of which are significant. In the rural sample, 7 correlations are positive, 2 of which only are significant.

Mother's education, in the urban sample, has 7 positive correlations, 5 of which are significant; in the rural sample, 5 are positive, only one of which is significant. Income, in the urban sample, has 6 positive correlations, 4 of which are significant. In the rural sample, 7 are positive, but none of them are significant.

In the urban sample, the LinSES score has 7 positive correlations, 4 of which are significant; in the rural sample, 7 correlations are positive, only one of which is significant.

Thus it is clear, that the effect of stabilization by having larger samples, is generally felt upon the sign of the correlation and not upon the size so much. The systematic difference between the urban and rural samples is also noteworthy.

We may attempt to summarize the above findings, for four select variables; Father's Education, Mother's Education, Income and LinSES score. The number of positive correlations that are positive in each group, which has been made somewhat larger by collapsing along the variable of sex, has been shown in Table 16-8.

Table 16-8

Number of positive correlations that are significant at least at .05 level that four selected family background variables have with 9 intervening and achievement variables in different groups in which subjects of both sexes have been combined

Variable	Grade I			Grade II			Grade V			All Grade		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Tot.	Urban	Rural	To
1. Father's Education	7	2	9	6	2	8	4	2	6	17	6	2
2. Mother's Education	6	1	7	5	1	6	5	1	6	16	3	19
3. Income	7	1	8	5	0	5	4	0	4	16	1	17
4. LinSES Score	7	3	10	6	2	8	4	1	5	17	6	[illegible]
Total ..	27	7	34	22	5	27	17	4	21	66	16	82

First we may note that, in the rural samples the number of positive correlations that are significant is less than one-fourth of that in the urban samples. Further, there is a systematic but only moderate decline in the number of positive significant correlations as we go from Grade I through Grade II to Grade V. This is consistent for both urban and rural samples. It will also be seen that LinSES is as good a predictor as Father's Education; these two are followed by Mother's education, and Income, in that order. The difference in the number of positive significant correlations for these 4 family background variables is not great.

Before we finish this section, we may look into the stabilization affect brought about by increasing sample, and introducing heterogeneity, in the following manner. Let us look into the significant positive correlations that each of their 4 family background variables has with 9 intervening and dependent variables. Expressed as a percentage of the total number of positively signed coefficients for each of these 4 variable, we get

the following figures :

Variable	With smaller core samples No. Significant	Out of	%	With larger samples No. Significant	Out of	%
1. Father's Education	30	84	35.7	23	46	50.0
2. Mother's Education	23	83	27.7	19	38	50.0
3. Income	17	78	21.8	17	43	39.5
4. LinSES Score	29	80	36.3	23	44	52.3

It will be quite clear, from the above summary, that the proportion of positive correlations that are statistically significant increases systematically for each of the 4 selected family background variables as large heterogenous groups are taken. This is the advantage of having larger samples, so that violent sampling fluctuations are progressively brought under control. We will return to this subject later for the 'best' variable, i.e., LinSES score.

B. Inter-correlations between School Facilities Variables and Intervening and Achievement Variables

Among what have been termed 'school variables' only the last three, viz, Teacher Qualification, Teacher-Pupil Ratio, and 'School Equipment and Facilities' give rise to ordered scores. A composite score called Linear sum of schooling Excellency category' score has also been obtained by summing the ordered scores from each of the three variables. This is called LinSEC score. These four variables have been correlated with each of the 9 intervening and achievement variables, for each of the 12 core groups, homogenous with respect to age-grade, location of school and sex. The correlations between the 4 school facilities variables and the 9 intervening and achievement variables, for different groups of Grade I are shown

in Table 16-9.

Table 16-9

Product-moment correlations between school facilities variables on one hand, and Intervening, Achievement Tests and Mosaic Test variables on the other for all subjects of Grade I

School variables	Group N	1 I.Q.	2 Social Mat.	3 Moral Relat.	4 Sociom. Index	5 Lang. Total	6 Maths.	7 No. of pieces	8 Area	9 Rating Total
1. Teacher Qualification	66 UM	347^{xx}	390^{xx}	215	267^{x}	657^{xx}	669^{xx}	319^{xx}	217	300^{x}
	42 UF	398^{xx}	221	330	332^{x}	190	353^{x}	200	203	-014
	61 RM	222	034	-096	083	-031	-128	036	028	011
	35 RF	-035	-440^{x}	284	222	305^{x}	200	-342	-298	131
2. Teacher Pupil Ratio	66 UM	-070	-606^{xx}	-041	-053	039	009	-021	-003	041
	42 UF	067	-160	045	112	036	057	259	-028	052
	61 RM	167	-025	074	149	-086	-059	279^{x}	180	151
	35 RF	-061	244	049	-012	-074	-140	-061	034	-046
3. School equipment & facilities	66 UM	324^{xx}	493^{xx}	342^{xx}	149	468^{xx}	553^{xx}	263^{x}	232	119
	42 UF	420^{xx}	206	395^{x}	-011	-073	236	094	-020	-010
	61 RM	-042	147	-040	-011	194	-029	-264^{x}	-198	253^{x}
	35 RF	-075	-497^{xx}	264	276	446^{xx}	290	-313	-280	171
4. LinSEC Score	66 UM	370^{xx}	298^{x}	322^{xx}	230	694^{xx}	743^{xx}	343^{xx}	271^{x}	267^{x}
	42 UF	405^{xx}	142	351^{x}	205	079	300	276	126	007
	61 RM	148	104	-029	100	081	-101	-031	-037	258^{x}
	35 RF	-006	-431^{xx}	337^{x}	287	-451^{xx}	226	-404^{x}	-315	156
1. Teacher Qualification	108UMF	390^{xx}	373^{xx}	274^{xx}	273^{xx}	303^{xx}	494^{xx}	329^{xx}	277^{xx}	152
	96RMF	050	-220^{x}	103	107	173	013	-129	-076	059
2. Teacher Pupil Ratio	108UMF	-030	-421^{xx}	-013	010	049	032	083	-022	048
	96RMF	107	104	053	106	-002	-004	128	130	074
3. School equipment ratio	108UMF	380^{xx}	441^{xx}	364^{xx}	088	106	382^{xx}	239^{x}	202^{x}	049
	96RMF	-043	-110	083	078	302^{xx}	105	-206	-219^{x}	220^{x}
4. LinSEC Scores	108UMF	411^{xx}	296^{xx}	345^{xx}	251^{xx}	320^{xx}	491^{xx}	341^{xx}	255^{xx}	127
	96RMF	045	-126	129	153	245^{x}	036	-192	-121	215^{x}

x $p < .05$; xx $p < .01$

Let us consider the correlations, variable-wise. The first variable, Teacher Qualification, has all its 9 correlations positive in the urban male group; in the urban female group, 8 correlations are positive. In the rural male group, however, only 6 are positive, and in the rural female group also 5 coefficients are positive out of 9.

With the next variable, Teacher-positive Ratio, the situation is much worse. In each group, there are anywhere from 2 to 6 negative correlations, out of 9. The correlation coefficients themselves are of low value generally.

The situation improves with the next variable, 'School equipment and facilities'. Here in the urban male group, all the 9 correlations are positive, but in the urban female group 5 correlations only are positive. In the rural male group, likewise, only 3 correlations are positive; in the rural female group, 5 correlations are positive.

The composite LinSEC score variable fares quite well. In both urban male and female groups, all the 9 correlations are positive. In the rural male group, 5 correlations are positive, and in the rural female group, also the same number of correlations is positive.

The effect of reducing sampling fluctuation by making the size of the samples larger, by combining samples of both the sexes together, is shown in the lower part of the same table.

Now, we note that for Teacher qualification, in the whole urban sample, (male and female together), all the 9 correlations are positive; in the entire rural sample, 6 correlations are positive.

For the next variable, Teacher-pupil Ratio, in the urban sample, 5 correlations are positive; in the rural sample, 7 correlations are positive. (This is an improvement).

For the next variable, school equipment and facilities, in the urban group, all correlations are positive, and in the rural group, 5 correlations are positive.

For the composite LinSEC score, in the urban sample, all 9 correlations are positive; in the rural sample, 6 correlations are positive.

The correlations between the same sets of variables, for different types of groups in Grade II are shown in Table 16-10.

Table 16–10

Product-moment correlations between School facilities variables on one hand and Intervening, Achievement Test and Mosaic Test variables on the other for all subjects of Grade II

School Variables &	Group N	1 IQ.	2 Social Mat.	3 Moral Relat.	4 Sociom. Index	5 Lang. Total	6 Maths	7 No. of pieces	8 Area	9 Rating total
1. Teacher Qualification	57 UM	-071	011	242	-224	335^{x}	151	388^{xx}	253	219
	39 UF	186	-358^{x}	-030	219	448^{xx}	010	414^{xx}	371^{xx}	163
	66 RM	134	-045	-239	098	-098	-257^{x}	194	052	160
	26 RF	059	032	444^{x}	144	151	419^{x}	-006	088	-180
2. Teacher Pupil Ratio	57 UM	-115	-187	072	-093	118	-208	004	133	-191
	39 UF	019	-427^{xx}	-248	-031	-022	043	-087	-102	-273
	66 RM	172	-242	-066	040	-131	-284^{x}	110	-035	227
	26 RF	174	054	-156^{x}	200	240	-049^{x}	-192	120	-189
3. School Equipment and facilities	57 UM	284	-081	303^{xx}	-072	156	168	499^{xx}	372^{xx}	200
	30 UF	150	-524^{xx}	-084	-106	144	-064	247	222	250
	66 RM	-016	217	296^{x}	040	-065	053	-165	-126	066
	26 RF	-038	-016	494^{x}	-077	026	410^{x}	-152	-047	-051
4. LinSEC Score	57 UM	072	-124	424^{xx}	-22	-384^{xx}	-113	560^{xx}	-450^{xx}	102
	39 UF	168	-567^{xx}	-135	036	272	-015	209	251	121
	66 RM	130	010	076	087	-151	-211	020	-084	225
	26 RF	073	026	532^{xx}	128	197	500^{xx}	-039	058	-058
1. Teacher Qualification	96 UMF	020	-173	122	-044	370^{xx}	088	395^{xx}	284^{xx}	194
	92 RMF	064	022	091	156	-010	012	141	129	050
2. Teacher Pupil Ratio	96 UMF	-073	-309^{xx}	-024	-055	095	-072	-040	060	-209
	92 RMF	171	-146	-091	126	-029	-219	134	039	210
3. School Equipment & facility	96 UMF	211^{x}	-309^{xx}	162	-087	138	057	395^{xx}	308^{xx}	223
	92 RMF	-042	143	389^{xx}	013	-035	180	-103	-040	037
4. LinSES Score	96 UMF	110	-381^{xx}	148	-093	309^{xx}	053	419^{xx}	337^{xx}	153
	92 RMF	077	044	273^{xx}	136	-042	032	052	047	144

x $p < .5$; xx $p < .01$.

We note that for the first variable, Teacher qualification, in the urban male group, there are 7 positive correlations, compared to the same number of positive correlations in the urban female group. In the rural male group, the number of positive correlations is 5 but in the rural female group the same is 7.

For the next variable, Teacher-Pupil Ratio, as in Grade I, the correlations are found to be low, and many are negative — 5 in urban male group; 7 in urban female group; 5 in rural male group, and 2 in rural female group. The situation improves somewhat with the next variable,

School Equipment and Facilities. Here, there are 7 positive correlations in the urban female group; in the urban male group, there are 5 positive correlations, and in the rural female group there are 3 positive correlations.

With the composite LinSEC scores the situation improves. In the urban male group, there are 7 positive correlations; in the urban female group there are 6 positive correlations; in the rural male group, there are 6 positive correlations, and in the rural female group there are 7 positive correlations. What happens, when the groups are made larger, by taking subjects of the two sexes together, is shown in the lower part of the same table.

For the first variable, Teacher Qualification, there are 7 positive correlations in the urban sample, compared to 8 positive correlations in the rural sample. For the second variable, Teacher-pupil Ratio, there are only 2 positive correlations in the urban sample, but in the rural sample there are 5 positive correlations. For the third variable, School Equipment and Facilities, in the urban sample, there are 7 positive correlations; compared to 5 positive correlations in the urban sample.

For the composite LinSEC variable there are 7 positive correlations in the urban sample, and 8 positive correlations in the rural sample.

The correlations between the same set of variables for different groups of Grade V are shown in Table 16-11.

Here, we find that, for the first variable, Teacher Qualification, there are only 4 positive correlations in the urban male group, compared to 7 positive correlations in the urban female group; in the rural male group again, 5 correlations are positive, and in the rural female group 6 correlations are positive.

For the second variable, Teacher-Pupil Ratio there are 6 positive correlations in the urban male group, compared to only 3 positive correlations in the urban female group. Again, while there are only 2 positive correlations in the rural male group, there are 5 positive correlations in the rural female group. With the third variable, School equipments and Facilities, the situation hardly improves. Thus in both urban male and female groups, there are 5 positive correlations each. In the rural male group, there are 3 positive correlations, compared to 5 positive correlations in the rural female group.

Table 16-11

Product-moment correlations between school facilities variables on one hand, and Intervening, Achievement Test and Mosaic Test Variables, on the other, for all subjects of Grade V

School variables and Group	N	1 I.Q.	2 Social Mat.	3 Moral Relat.	4 Sociom. Index	5 Lang. Total	6 Maths	7 No. of pieces	8 Area	9 Rating Total
1. Teacher Qualification	65 UM	254^{x}	-306^{x}	411^{xx}	-263^{x}	510^{xx}	297^{xx}	-054	-094	-111
	32 UF	077	-121	432^{x}	-165	406^{x}	141	185	355^{x}	281
	83 RM	024	-010	001	-170	-174	-056	158	072	194
	31 RF	264	-469^{xx}	259	000	400^{x}	511^{x}	-377^{x}	-343	024
2. Teacher Pupil Ratio	65 UM	147	116	-090	222	049	-218	147	118	-133
	32 UF	-287	048	-221	-806	-254	-263	167	017	-295
	83 RM	139	-119	-057	-080	-164	-090	-056	-007	087
	31 RF	-131	462^{x}	-031	208	-253	-143	071	044	-208
3. School Equipment and facilities	65 UM	155	-447^{xx}	544^{xx}	-091	571^{xx}	364^{xx}	-084	044	005
	32 UF	-124	-016	421^{x}	-305	150	-184	268	385^{x}	145
	83 RM	-095	-188	[illegible]	[illegible]	-062	-048	-068	-189	077
	31 RF	127	-554^{xx}	242	-213	383^{x}	317	-406^{x}	-304	149
4. LinSEC Scores	65 UM	285^{x}	-391^{xx}	516^{xx}	-114	637^{xx}	298^{x}	-025	-019	-107
	32 UF	-111	-047	325	-300	175	-103	-289	346	105
	83 RM	018	-190	007	-112	-186	-099	-003	-091	166
	31 RF	171	-449^{x}	319	007	380^{x}	428^{x}	-455^{x}	[illegible]^{x}	097
1. Teacher Qualification	97 UMF	225^{x}	-278^{xx}	420^{xx}	-197	483^{xx}	260^{xx}	073	106	015
	114 RMF	.038	-312^{xx}	049	-094	-073	029	-019	[illegible]	144
2. Teacher-Pupil Ratio	97 UMF	-048	116	-146	072	-046	-244^{x}	136	063	-182
	114 RMF	046	049	-045	007	-197^{x}	-114	-014	-017	006
3. School equipment & Facilities	97 UMF	089	-340^{xx}	504^{xx}	-118	472^{xx}	201^{x}	079	191	048
	114 RMF	-061	-346^{xx}	089	-069	020	006	-175	-201^{x}	001
4. LinSEC	97 UMF	147	-288^{x}	440^{xx}	-140	488^{xx}	160	126	180	-027
	114 RMF	-002	-347^{xx}	061	084	-109	-030	-130	-169	135

x $p < .05$; xx $p < .01$.

With the last variable, LinSEC scores, the situation is more or less the same. There are 5 positive correlations in the urban male group and the same in the urban female group. In the rural male group, there are only 3 positive correlations compared to 6 in the rural female group.

The effect of stabilization brought about by increase in the sample size is shown in the lower part of the table.

Here, with Teacher qualification, there are 7 positive correlations in the urban sample and 4 positive correlations in the rural sample, With Teacher-pupil ratio, there are 4 positive correlations in the urban sample compared to the same number of positive correlation in the rural sample. With the third variable, School Equipment and Facilities, there are 7 positive correlation in the urban sample, compared to 6 in the rural sample. For the composite LinSEC scores variable, there are 6 positive correlations in the urban sample and only 2 positive correlations in the rural sample.

The systematic trends in the variation of the correlations, as we go from one variable to the next, and from one group to another, can be brought out by some summary tabulations. First, the number of positive correlations that are statistically significant at least at the .05 level, for each of the 4 school facilities variables, in the different small core groups, is shown in Table 16-12.

Table 16-12

Number of positive and statistically significant correlations that each of the four school facilities variable has with a intervening and achievement variable in different core groups

Variable	Urban Male	Urban Female	Urban Total	Rural Male	Rural Female	Rural Total	All Male	All Female	All Total	Grade I	Grade II	Grade V	Grade T	Total positive correlation
1. Teacher Qualification	13	10	23	0	5	5	13	15	28	12	7	9	28	77
2. Teacher Pupil Ratio	0	0	0	1	1	2	1	1	2	1	0	1	2	51
3. School Equipment Facilities	12	4	16	2	4	6	14	8	22	10	6	6	22	60
4. LinSEC	16	2	18	1	6	7	17	5	25	13	6	6	25	74
Total	41	16	57	4	16	20	45	32	77	36	19	22	77	262

First, it may be noted that while in the urban sample, there are 57 positive correlations, in the rural sample, it dwindles to only 20. A strong sex X location interaction seems to be operating. Further, there is some systematic age-grade differences also evidenced by a large number of positive significant correlations in Grade I against a much smaller number in Grade II and V. In terms of prediction of the intervening and achievement variables both Teacher qualification and the composite LinSEC

variable appear to be equally good - followed by 'school equipment facilities'. Obviously, 'teacher-pupil ratio' is not a satisfactory predictor for these intervening and achievement variables.

In the next table, the effect of stabilization due to partial elemination of small sampling fluctuations is looked into. The number of correlations that are positive and significant at least at .05 level for groups that are homogonous with respect to school location and grade, but heterogenous with respect to sex, is shown in Table 16-13.

Table 16-13

Number of positive and statistically significant correlations that each of the four school facilities variables has with the nine intervening and achievement variables in different groups of subjects of both sexes

Variable	Grade I			Grade II			Grade V			All Grades			Total number of positive correlations
	U.	R.	T.	U.	R.	T.	U.	R.	T.	U.	R.	T.	
1. Teacher Qualification	8	0	8	3	0	3	4	0	4	15	0	15	41
2. Teacher Pupil Ratio	0	0	0	0	0	0	0	0	0	0	0	0	27
3. School Equipment	6	2	8	4	1	5	3	0	3	13	3	16	37
4. LinSEC Score	8	2	10	3	1	4	2	0	2	13	3	16	30
Total	22	4	26	10	2	12	9	0	9	41	6	47	143

Here again the urban-rural differential is quite clear which holds across there age-grades.

As before we can look into the nature of the stabilization effect on the correlation of each of the 4 selected background variables, which is summarized below in Table 16-14.

Table 16-14

The proportion of correlations that are statistically significant at least at .05 level, for different types of groups systematically varying in size

Variable	Small core group No. of significant correlations	Out of total positive correlations	Percentage	In large groups No. of significant correlations	Out of Total positive r's	Percentage
1. Teacher qualification	28	77	36.4	15	41	31.7
2. Teacher Pupil Ratio	2	51	3.9	0	27	0.0
3. School Equipment	22	60	36.7	16	37	43.3
4. LinSEC Score	25	74	33.8	16	38	42.1

It will be seen that the proportion of correlations that are significant, out of the total number of positive correlations, increases somewhat in two variables - School Equipment and Facilities, and LinSEC Scores, and is reduced somewhat in two variables, viz., Teacher Qualification and Teacher-pupil ratio. Two conclusions are logical : LinSEC variable appears to be the best among the predictors of the intervening and achievement variable being closely followed by School Equipment and Facilities, and Teacher Qualification, coming after that. Teacher pupil ratio is a very poor predictor.

We will close this section with an analysis of the systematic effect of increasing group size and heterogeneity on the correlations of the intervening and achivement variables with LinSES scores first, and then LinSEC scores.

Instead of taking into account all of the separate background variables, it will be better to consider only one variable, viz, LinSES score, because, firstly, this is a composite score derived from all family background variables, and secondly, this has been shown to have most satisfactory predictive ability among all the separate family background variables. The correlations of LinSES scores with each of the nine selected intervening and achievement variables for groups of increasing size and heterogeneity are shown in Table 16-15.

Table 16-15

Product-moment correlations of LinSES across with chosen Intervening, Achievement and Mosaic Test variables for groups varying in composition and size according to location, grade and sex

Group composition	N	1 I.Q.	2 Social Mat.	3 Moral Relat.	4 Sociom. Index	5 Lang. Total	6 Maths ach.	7 No. of pieces	8 Area	9 Rating Total
I, MFU	100	446^{xx}	241^{x}	317^{xx}	161	438^{xx}	563^{xx}	183	098	339^{xx}
II, MFU	96	116	-035	296^{xx}	-056	511^{xx}	258^{x}	300^{xx}	286^{xx}	320^{xx}
V, MFU	97	267^{xx}	-225^{x}	516^{xx}	-060	401^{xx}	352^{xx}	082	090	127
I, MFR	96	-216^{x}	-268^{xx}	297^{xx}	120	283^{xx}	258^{x}	-001	035	063
II, MFR	92	-114	213^{x}	102	168	179	223^{x}	-025	020	-003
V,MFR	114	041	-022	091	057	207^{x}	121	176	096	-067
I,II,V,M U	100	340^{xx}	049	385^{xx}	-004	562^{xx}	482^{xx}	183^{x}	178^{x}	295^{xx}
I,II,V,FU	113	290^{xx}	011	408^{xx}	039	262^{x}	135	255^{x}	212^{x}	231^{x}
I,II,V,M.R.	210	-047	017	227^{xx}	071	260^{xx}	170^{x}	153^{x}	133	077
I,II,V,F.R.	92	116	051	083	279^{xx}	.234^{x}	212^{x}	-073	-134	-056
I,II,V,MFU	301	297^{xx}	023	390^{xx}	007	454^{xx}	350^{xx}	198^{xx}	172^{xx}	270^{xx}
I,II,V,MFR	302	-062	-023	173^{xx}	120^{x}	225^{xx}	163^{xx}	096	063	034
I,M,UR	127	274^{xx}	201^{x}	336^{xx}	130	522^{xx}	593^{xx}	144	134	327^{xx}
I,F,UR	77	266^{x}	007	321^{xx}	214	181	290^{xx}	160	068	100
II,M,UR	123	-016	-004	137	-102	433^{xx}	273^{xx}	340^{xx}	319^{xx}	233^{xx}
II,F,UR	35	132	-035	210	112	114^{xx}	139	078	153	179
VM,UR	148	178^{x}	-212^{xx}	429^{xx}	-018	401^{xx}	291^{xx}	114	120	082
V,F,UR	6[illegible]	254^{x}	-023	377^{xx}	-030	311^{xx}	202^{x}	101	086	082
I,MF,UR	[illegible]	242^{xx}	090	323^{xx}	155^{x}	309^{xx}	479^{xx}	144^{x}	102	268^{xx}
II,MF,UR	188	-001	-028	220^{xx}	021	454^{xx}	248^{xx}	239^{xx}	257^{xx}	232^{xx}
V,MF,UR	211	173	-156^{x}	393^{xx}	-027	352^{xx}	263^{xx}	135^{x}	104	004
I,II,V,MF,UR I,II,V,F,UR	205	229^{xx}	005	325^{xx}	103	[illegible]16^{xx}	170^{x}	153^{x}	121	162^{x}
I,II,V,MF,UR	603	152^{xx}	-024	326^{xx}	046	387^{xx}	304^{xx}	180^{xx}	166^{xx}	200^{xx}

x $p < .05$; xx $p < .01$.

It will be seen that in the first six rows, are shown correlations for groups which are homogenous with respect to location of schools, and of age-grade, but heterogenous with respect to sex. The sizes of the groups are not widely different, the smallest being 92 and largest being 114.

Close study of the six rows of coefficients will show some systematic difference. In Grade I, urban sample, all the 9 correlations are positive; in Grade II, and Grade V, there are only 7 correlations which are positive. The rural groups do not differ much among each other: there are 6 positive correlations in grade I, and 7 positive correlations in both Grades II and V.

We can compare these six groups, heterogenous with respect to sex, but homogenous with respect to location and grade, with 6 other groups, which are homogenous with respect to sex and age-grade, but heterogenous with respect to location of schools. These correlations are shown in rows 13 through 18, in Table 16-15.

Here too some systematic variations from group to group can be teased out. Thus in Grade I, in both the male and female samples, all the 9 correlations are positive. In Grade II male Group, there are three negative correlations as compared to one negative correlation in Grade II female Group. In both the male and female groups of Grade V, 7 correlations are positive.

Next, we can compare 4 groups, which are homogenous with respect to sex and location, but heterogenous with respect to age-grade. Here again, we note, that while in the urban, male group there is just one negative correlation, in the urban, female group, all the nine correlations are positive. In the male, rural group there is just one negative correlation, compared to 3 negative correlations in the female, rural group.

Let us note that, there are three groups, which are homogenous only with respect to age-grade, but heterogenous with respect to both, sex and location. Here again in Grade I, all the nine correlations are positive; in Grade II, and Grade V, 7 correlations are positive. That location is the one factor which tends to lower down the correlation values is evidenced by the fact that, in the really large sample of all subjects of the three grades and both sexes, in the urban sample, all the correlations are positive, but in the rural sample, only seven are positive. Again, in the fairly large sample which is homogenous with respect to sex, in the female sample, all the nine correlations are positive.

The type of analysis we have done for LinSES score is now repeated for the composite score for school facilities variables, named LinSEC scores. The correlations of these variable with the nine selected intervening and achievement variables for groups of increasing size and heterogeneity are shown in Table 16-16.

The type of improvement that was evident with increasing sample size and heterogeneity in size and signs of the correlations with LinSES score is not present with the LinSEC scores, as a perusal of Table 16-16 will show. There are certain variables like 'social maturity' which tends to correlate negatively with LinSEC scores, irrespective of group size

and degree of heterogeneity. This is also largely true for the variable 'sociometric status index". Both of the two achievement variables, 'language total' and 'mathematics' have tended to have moderately valued and positive correlations with LinSEC scores, which is to be expected on logical groups. This is also largely true for the Mosaic test variables - where, the correlations in certain types of groups have tended to become larger and positive.

Table 16-16

Product-moment correlations of LINSEC scores with selected Intervening, Achievement and Mosaic Test variables for groups varying in composition and size, according to location, grade and sex

Group composition	N	1 I.Q.	2 Social Mat.	3 Moral Relat.	4 Sociom Index	5 Lang. total	6 Maths Ach.	7 Time Taken	8 Area	9 Rating Total
		Intervening, Achievement and Mosaic Test Variables								
I,MFU	100	411^{xx}	296^{xx}	345^{xx}	201^{x}	329^{xx}	491^{xx}	341^{xx}	255^{xx}	127
II,MFU	96	110	-381^{xx}	140	-093	309^{xx}	053	419^{xx}	337^{xx}	153
V,MFU	97	147	-288^{xx}	440^{xx}	-140	488^{xx}	160	126	180	-027
I,MFR	96	046	-126	129	153	245^{x}	036	-192	-121	215^{x}
II,MFR	92	077	044	273^{xx}	136	-042	032	052	047	144
V, MFR	114	-002	-347	061	-084	-109	-030	-130	-169	135
I,II,V,MU	188	266^{xx}	-050	422^{xx}	-020	570^{xx}	464^{xx}	279^{xx}	257^{xx}	116
I,II,V,FU	113	130	-169	197^{x}	-042	171	027	288^{xx}	258^{xx}	078
I,II,V,MR	210	067	-057	-040	-031	-094	-080	-021	-079	136^{x}
I,II,V,FR	92	079	-286^{xx}	410^{xx}	143	334^{xx}	227^{x}	-232^{x}	-154	098
I,II,V,MFR	302	028	-177^{xx}	107	025	049	023	-087	-093	118^{x}
I, MUR	127	146	035	346^{xx}	172	304^{xx}	416^{xx}	262^{xx}	240^{xx}	259^{xx}
I, FUR	77	199	-093	363^{xx}	261^{x}	266^{x}	320^{xx}	025	-003	100
II, MUR	123	009	-203^{x}	176^{x}	-078	121	-033	436^{xx}	355^{xx}	208^{x}
II, FUR	65	094	-485	092	029	334^{xx}	165	131	183	102
V, MUR	140	114	+357^{xx}	294^{xx}	-046	204^{xx}	111	117	059	120
V,F,UR	63	013	-159	342^{xx}	-163	297^{xx}	121	004	059	102
I,MF,UR	204	192^{xx}	055	347^{xx}	202^{xx}	308^{xx}	369^{xx}	178^{x}	179^{x}	192^{xx}
II,MF,UR	108	019	-333^{xx}	178^{x}	-013	232^{xx}	066	312^{xx}	295^{xx}	179^{x}
V,MF,UR	211	076	-295^{xx}	305^{xx}	-074	276^{xx}	109	079	058	122
I,II,V MF,UR I,II,V,F,UR	205	105	-226^{xx}	207^{xx}	035	280^{xx}	145^{x}	083	115	109
I,II,V,MF,UR	603	086^{x}	-190^{xx}	250^{xx}	006	263^{xx}	204^{xx}	179^{xx}	188^{xx}	131^{xx}

^{x} $p < .05$; ^{xx} $p < .01$

In order to bring some order into these rather complicated trends, some sort of summary will be necessary. This is attempted for both the LinSES and LinSEC variable correlations in Table 16-17.

Table 16-17

Number of positive correlations that are statistically significant (at least at .05 level), that LinSES and LinSEC variables have with each of the nine selected intervening and achievement variables in groups of increasing size and heterogeneity

Variable	Urban MF				Rural MF				Urban, Rural MF				Urban+Rural
	I	II	V	Total	I	II	V	Total	I	II	V	Total	M+F I,II,V
LinSES	6	6	4	16	3	2	1	6	7	6	5	18	7
LinSEC	8	3	2	13	2	1	0	3	8	5	[illegible]	[illegible]	7

	Urban I,II,V			Rural. I,II,V			Urban	Rural	I,II,V	U+R, M+F
	Male	Female	T.	Male	Female	T.	MF	MF	Total	I,II,V
LinSES	7	6	13	5	3	8	7	4	11	7
LinSEC	7	3	10	1	3	4	6	1	7	6

It will be seen, that while both LinSES and LinSEC scores are efficient predictors of the intervening and achievement variables, LinSES is slightly better than LinSEC. Both predict better for urban groups than rural groups, but when both locations are combined, the number of significant correlations tend to increase for both LinSES and LinSEC scores. There is, however, enough evidence to conclude, that in the heterogenous groups of fairly large size, such is the entire sample of the present study of 603 subjects, which is fully heterogenous with respect to sex, location of school and age-grade, both LinSES and LinSEC scores, are very efficient predictors of the chosen nine intervening and dependent variables.

These two composite variables correlate negatively with social maturity and low positively with sociometric status index. With the remaining seven variables, the correlation coefficients are positive and significant.

Significance of Differences between Group Means of Selected Variables

Thus far, in the statistical description of the findings of the study, technicalities have been avoided - so that readers, outside the circle of the so-called experts could follow it without any special effort. For the sake of achieving some measures of scientific completeness this chapter has been prepared, dealing with the statistical significance of the differences between the means of variables studied for different groups, which are smaller samples out of the universe, selected in terms of a few control variables like age-grade, sex, and location of schools in urban and rural areas.

Let us recall that the smallest samples are elementary or core samples, with regard to age-grade, sex, and location of schools. With three age-grades, two sexes and two types of location of schools (urban and rural), there are 12 core groups, such as grade I, male, urban, or grade I, female, urban, grade I, male, rural and so on. Within each grade, by forming a composite group of all males, drawn from both urban and rural scales, a somewhat larger group can be formed, which is homogenous with respect to sex and age-grade, but heterogenous with respect to location of schools in which they study. In this the following six groups are formed:

Group I	Grade I	- Male (N=127)
Group II	Grade I	- Female (N=77)
Group III	Grade II	- Male (N=123)
Group IV	Grade II	- Female (N=65)
Group V	Grade V	- Male (N=148)
Group VI	Grade V	- Female (N=63)

Now, we know that respondents in each of these groups simultaneously vary along three major clusters of variables - family background and socio-economic status, quality of schooling undergone, and location of schools in urban or rural areas. The last variable, location of schools is called A, and it has two values: A1 = Urban, and A2 = Rural. The first cluster of variables is best represented by the composite measure called LinSES, and it can assume any value from 2 to 42. For the present analysis, any group number in accordance with his or her obtained LinSES score, will fall into one of the following three categories:

D1 = Low SES, those obtaining LinSES scores from 2 to 15
D2 = Medium SES, those obtaining LinSES scores from 16 to 29
D3 = High SES, those obtaining LinSES scores from 30 to 42.

The second cluster of variables is best represen-ted by the composite measure called LinSEC, and it can assur any value from 3 to 9. Any [illegible] number depending upon what the school, in which [illegible] studying, obtains as LinS- score, will fall into one of the three following categories:

E1 = Low SEC, those obtaining LinSEC scores of 3 and 4
E2 = Medium SEC, those obtaining LinSEC scores of 5, 6 and 7
E3 = High SEC, those obtaining LinSEC scores of 8 and 9.

This means, that any group, I through III, may be partitioned orthogonally in three ways: by location, by SES category, and by School Excellence category. Any one subject will thus be either going to an urban school or a rural school; he would belong either to low, middle or high SES level; and his school will be either poor, medium or good in terms of excellence of academic quality.

The question that next can be asked is this: What is the effect of these factors, location of school in urban or rural areas, belonging to a family with low, medium or high SES level, and the school in which study is being carried on, having poor, medium or good academic facilities - on the score in each of the intervening variables, and performance variables. This boils down to a three-way, factorial analysis of variance, in which the three main effects are A, due to location of school, D, due to belongingness in differing socio-economic status level, and E, due to studying in schools differing in academic quality. There will also be three first-order interaction AD, AE, and DE, i.e. Location x SES, Location x Quality of schooling, and SES x quality of schooling, respectively.

The cells in the three-part analysis of variance will contain unequal numbers (some of the cells, representing particular, theoretically possible combinations of different levels of the three factors, A, D and E might be empty, as well), and therefore the average of the cell itself (in the criterion or dependent variable which is being analysed) is taken as a single score within the group. In this way, we obtain the second-order interaction A x D x E as the residual or error term, with which the significance of the three main effects A, D and E, and the three interactions AD, AE and DE are estimated.

This type of anova has been done for each of six groups with the following selected measures:

Among Intervening variables (1) Intelligence Quotient
(2) Social maturity
(3) Moral relativism
(4) Sociometric status index

Among Achievement variables (5) Hindi Achievement total
(6) Mathematics Achievement

Among Performance Variables (7) Time taken to complete the mosaic design
(8) Total number of pieces used
(9) Number of subdesigns
(10) Area of tray covered by the design
(11) Rating - total, of qualitative features of the mosaic design.

The results of the anova are presented below, in the order of variables. It will be seen that some sort of selection has been made from out of all the variables for which detailed statistics have been provided in Chapters 12, 13 and 14. This has been done on logical grounds, and also for the purpose of keeping the length of the chapter within reasonable limits. For example, we have to make a choice between mental age and IQ, both being very highly correlated. The same logic applies to the three sub-scales of the Hindi achievement test, which are very highly correlated, and also to the three sub-Rating scales for the mosaic test, which are also highly correlated.

Results of Analysis of Variance

1. Intelligence Quotient. The results of the analysis of variance of IQ scores for groups I through VI have been shown in Table 17-1.

It may be mentioned at the outset, that in all tables, from Table 17-1 to 17-11 both inclusive, those F ratios to which are not attached either one or two asterisks (*, or **) are statistically 'not significant)!

A perusal of Table 17-1 will point to a few interesting results. Main effect of 'Location', of schools, fails to reach statistical significance even at .05 level in any of the six groups. Main effect of SES, however, attains significance in 3 groups out of six: in grade I, male, in grade II, female, and grade V, female. In grade II, female, the level of significance reached is .01, in the other two groups it is .05. Among the 3 interactions, only one, AxE, that is between location of schools and school excellence

Table 17-1

Analysis of variance of IQ scores of different groups

Sources of variation	DF	Mean Squares	F	Mean Squares	F
		Group I:I, male		Group II:I, Fem	
Main Effects: Locations (A)	1	1514.70	5.66	1855.42	2.86
SES (D)	2	3346.50	12.61*	4022.02	6.24
School Excellence (E)	[illegible]	[illegible]176.99	8.13*	675.22	1.05
Interactions: A x D	2	[illegible]7.15	3.79	896.88	1.39
A x E	2	[illegible]5.67	9.29**	3303.10	5.19
D x E	[illegible]	[illegible]	7.76*	3616.41	5.61
Residuals: A x D x E	4	267.75	--	644.73	--
Total	17				
		Group III:II, male		Group IV:II, fem	
Main Effects: Location (A)	1	7.[illegible]1	0.90	1696.73	7.29
SES (D)	2	[illegible]	5.29	5037.99	21.69
School Excellence (E)	2	[illegible]	2.83	580.97	2.49
Interactions: A x D	2	1717.37	2.19	543.56	2.34
A x E	2	6301:39	7.99*	7165.99	30.82
D x E	4	2757.04	3.59	1850.32	7.96
Residuals: A x D. x E	4	788.90	---	232.54	--
Total	17				
		Group V:V, male		Group VI:V, femal	
Main Effects: Location (A)	1	54.95	0.05	5273.65	7.11
SES (D)	2	3651.73	3.28	7781.30	10.48*
School Excellence (E)	2	1024.49	1.46	1834.30	2.45
Interactions: A x D	2	2509.29	2.25	1948.06	2.61
A x E	2	9393.06	8.42*	2173.53	2.93
D x E	4	3959.12	3.55	4119.66	5.55
Residuals: A x D x E	4	1115.14	----	742.19	--
Total	17				

attains significance level 4 out of the six groups - in grade I, male (at .01%), and in grade II, male, grade II, female, and grade V, male, groups, at .05 level in the last 3 groups. Another interaction, DxE, that is between SES and School Excellence is significant in only three groups: grade I, male, grade II, female, and grade V, male.

The results are not very easily explained. Socio-economic status level, and the interaction of school excellence with either location, or SES, may operate in a way to raise the functional level of intelligence - in the more advantaged groups in terms of home affluence and better schooling, but it may have little genetic determinism. School excellence by itself has produced a significant difference in only grade I, male. It is noteworthy that in the matured age-grade, (grade V, groups V and VI), significant F ratios are only two. On the whole, IQ is a sturdy measure, not to be oscillating too much due to qualitative group differences.

2. Social Maturity

The results of the analysis of variance are shown in Table 17-2.

It will be at once seen that the main effect of 'location' does not attain statistical significance in any of the six groups. The main effect of SES however reaches significance level in 4 out of six groups, grade I, both male and female, grade II, female, and grade V, female, groups. In grade II, female group, the F ratio reaches significance at .01 level; in other 3 groups it is significant at .05 level. The main effect of school excellence also fails to reach significance in any of the six groups.

Among the interactions, one, viz. AxE, between Location and School excellence, reaches significance in 3 groups: in grade I, male at .01 level, in grade II, male, at .05 level, and grade II, female, also at .05 level. The interaction DxE, i.e. between SES and school excellence is also significant, in 2 groups, viz. in grade V, female, and grade II, female, at .05 level in both groups. No other interaction or main effect is significant in any group. The result seems to be logically tenable - both SES and the School being directly related to social maturity.

3. Moral Relativism

The results of the analysis of variance are shown in Table 17-3.

Table 17-2

Analysis of variance of 'social maturity' scores of different groups

Sources of variation		DF	Mean Squares	F	Mean Squares	F
			Group I:I, male		Group II:I, female	
Main Effects:	Locations (A)	1	705.64	1.13	1693.56	3.33
	SES (D)	2	6266.19	10.09*	10438.46	20.43*
	School Excellence (E)	2	2319.84	3.72	3396.75	6.66
Interactions:	A x D	2	1293.70	2.08	1044.29	2.44
	A x E	2	15947.95	25.67**	2141.99	4.19
	D x E	4	2870.86	4.62	3507.23	6.89*
Residuals:	A x D x E	4	621.19	---	510.98	---
	Total	17				
			Group III:II, male		Group IV:II, female	
Main Effects:	Locations (A)	1	32.46	0.03	1862.86	2.99
	SES (D)	2	5468.47	5.64	9280.71	14.93*
	School Excellence (E)	2	3378.50	3.42	1409.41	2.27
Interactions:	A x D	2	2394.29	2.32	1217.90	1.95
	A x E	2	8633.83	8.75*	7533.14	12.12*
	D x E	4	4140.26	4.19	4022.12	6.47*
Residuals:	A x D x E	4	987.33	---	621.48	---
	Total	17				
			Group V:V, male		Group VI:V, female	
Main Effects:	Locations (A)	1	16146.05	0.16	4809.67	4.83
	SES (D)	2	597331.60	5.81	9783.25	9.82*
	School Excellence (E)	2	360216.53	3.51	3217.77	3.23
Interactions:	A x D	2	190724.37	1.85	399.32	0.40
	A x E	2	773802.00	7.52*	2271.30	2.29
	E x E	4	354009.32	3.41	5427.03	5.45
Residuals:	A x D x E	4	102732.12	---	995.99	---
	Total	17				

Table 17-3

Analysis of variance of 'moral relativism' scores of different groups

urces of variation	DF	Mean Squares	F	Mean Squares	F
		Group I:I, male		Group II:I, female	
in Effects: Locations (A)	1	26.04	3.25	81.96	4.36
SES (D)	2	73.08	8.78*	74.63	3.97
School Excellence (E)	2	28.18	3.39	7.70	0.49
teractions: A x D	2	12.53	1.51	17.93	0.96
A x E	2	210.94	25.35**	54.62	2.91
D x E	4	24.20	2.91	66.78	3.56
siduals: A x D x E	4	8.32	---	18.78	---
Total	17				
		Group III:II, male		Group IV:II, female	
in Effects: Locations (A)	1	0.03	0.00	68.21	6.99
SES (D)	2	56.68	3.51	115.70	11.87*
School Excellence (E)	2	26.73	1.65	22.58	2.32
teractions: A x D	2	32.22	1.99	9.66	0.99
A x E	2	122.43	7.57*	120.95	12.41*
D x E	4	49.89	3.09	40.87	4.19
siduals A x D x E	4	16.17	---	9.74	---
Total	17				
		Group V:V, male		Group VI, V, female	
in Effects: Locations (A)	1	3.86	0.14	103.87	5.54
SES (D)	2	74.91	2.81	114.16	6.09
School Excellence (E)	2	31.11	1.16	9.29	0.49
teractions: A x D	2	54.69	2.05	31.85	1.70
A x E	2	211.67	7.93*	79.64	4.25
D x E	4	84.34	3.17	89.38	4.77
siduals: A x D x E	4	26.70	---	18.76	---
Total	17				

It will be noted, that among the three main effects, only one, viz. SES, obtains significance level at .05%, in only two groups: grade I, male, and grade II, female. Among the interactions again, only one, viz. between location and school excellence, is significant in four groups. In grade I, male, it is significant at .01% level; in grade II, male, in grade II, female and grade V, male, it is significant at .01% level. No other main effect, nor any inter-action is significant, in group. Development of a moral sense has been found to be related to socialization and environmental influences - this is confirmed by the results of the analysis of variance.

4. <u>Sociometric status Index scores</u>

The results of the analysis of variance of the sociometric status index scores obtained by the six different groups are shown in Table 17-4.

The results are seen to have one peculiarity whatever main effects and interactions reach significance level, are found in only two groups: grade I, male, and grade II, female. In grade I, the main effect of location is significant at .05 level, but it is negligible in grade II, female, and of course in all the remaining four groups. The other two main effects, SES and School excellence, are significant in both these groups. In fact, school excellence attains a level of significance of .01% in grade I, male, but only .05% in gradeII, female. Among the three interactions, one, viz. between Location and school excellence, reaches significance beyond .01 level in grade I, male, and just at .05 level in grade II, female. Another interaction, between SES and school excellence, is significant at .05 level in both the groups, viz. grade I, male, and grade II, female. In all the four remaining groups, neither any main effect, nor any of the interactions, attain significance level.

5. <u>Achievement Test in Hindi</u>

The results of the analysis of variance of Hindi achievement test scores, for the three subtests combined, have been shown in Table 17-5.

As with the previous measure of sociometric status score, with this measure also, it is found that whatever F ratios manage to attain statistical level of significance, are concentrated within the same two groups only, viz. group I, male, and grade II, female. The main effect of location

Table 17-4

Analysis of variance of 'sociometric status index' scores of different groups

urces of Variation	DF	Mean Squares	F	Mean Squares	F
		Group I:I, male		Group II:I, female	
in Effects: Locations (A)	1	403.09	19.31*	72.12	0.39
SES (D)	2	286.68	13.73*	823.19	4.55
School Excellence (E)	2	553.63	26.51**	343.61	1.84
teractions: A x D	2	6.08	0.29	16.45	0.09
A x E	2	761.32	32.46**	301.33	1.67
D x E	4	211.69	10.14*	128.50	0.69
iduals: A x D x E	4	20.87	---	180.77	---
Total	17				
		Group III:II, male		Group IV:II, female	
n Effects: Locations (A)	1	32.00	0.39	35.73	0.37
SES (D)	2	340.06	4.13	753.82	7.99*
School Excellence (E)	2	208.36	2.53	698.08	7.39*
eractions: A x D	2	34.67	0.42	18.19	0.19
A x E	2	209.20	2.54	642.09	6.81*
D x E	4	108.32	1.31	246.46	2.61
iduals: A x D x E	4	82.42	---	94.27	---
Total	17				
		Group V:V, male		Group VI:V, female	
n Effects: Locations (A)	1	64.11	0.17	15.31	5.26
SES (D)	2	329.26	0.90	12.69	4.34
School Excellence (E)	2	205.19	0.56	6.82	2.33
eractions: A x D	2	630.45	1.73	1.94	0.66
A x E	2	2073.72	5.69	5.75	1.96
D x E	4	1014.05	2.78	8.10	2.76
iduals: A x D x E	4	364.68	---	2.93	---
Total	17				

Table 17-5

Analysis of variance of 'Hindi Achievement Total' scores of different groups

Sources of Variation	DF	Mean Squares	F	Mean Squares	F
		Group I:I, male		Group II:I, female	
Main Effects: Locations (A)	1	646.08	4.25	1439.34	1.99
SES (D)	2	687.36	4.52	1547.76	2.14
School Excellence (E)	2	1149.46	7.56*	175.59	0.24
Interactions: A x D	2	391.07	2.57	155.30	0.21
A x E	2	5319.48	34.33**	770.76	1.81
D x E	4	202.85	1.33	405.32	0.56
Residuals: A x D x E	4	152.04	---	722.63	---
Total	17				
		Group III:II, male		Group IV:II, female	
Main Effects: Locations (A)	1	273.47	0.73	3321.13	15.28*
SES (D)	2	471.48	1.23	680.06	3.23
School Excellence (E)	2	76.27	0.19	1006.93	4.78
Interactions: A x D	2	484.01	1.26	258.00	1.24
A x E	2	1958.97	5.13	2224.10	10.55*
D x E	4	546.96	1.43	373.01	1.77
Residuals: A x D x E	4	381.72	---	210.70	---
Total	17				
		Group V:V, male		Group VI:V, female	
Main Effects: Locations (A)	1	33.78	0.10	925.50	6.19
SES (D)	2	811.42	2.51	628.10	4.19
School Excellence (E)	2	113.22	0.35	46.30	0.31
Interactions: A x D	2	341.14	1.05	154.39	1.03
A x E	2	1843.53	5.69	401.15	2.79
D x E	4	496.63	1.53	537.48	3.39
Residuals: A x D x E	4	323.51	---	149.75	---
Total	17				

Table 17-6

Analysis of variance of 'Mathematics Achievement' scores of different groups

Sources of Variation	DF	Mean Squares	F	Mean Squares	F
		Group I:I, male		Group II:I, female	
Main Effects: Locations (A)	1	214.11	18.95*	421.66	4.16
SES (D)	2	123.62	10.94*	254.17	2.51
School Excellence (E)	2	231.54	20.49**	1.64	0.02
Interactions: A x D	2	27.37	2.42	36.54	0.36
A x E	2	890.01	78.76**	150.63	1.49
D x E	4	52.09	4.61	133.72	1.32
Residual: A x D x E	4	11.30	---	101.16	---
Total	17				
		Group III:II, male		Group IV:II, female	
Main Effects: Locations (A)	1	3.35	0.17	87.25	11.92*
SES (D)	2	46.63	2.35	64.75	8.84*
School Excellence (E)	2	4.04	0.20	35.67	4.86
Interactions: A x D	2	24.68	1.24	5.09	0.69
A x E	2	115.36	5.81	98.59	13.67*
D x E	4	30.90	1.54	24.19	3.30
Residuals: A x D x E	4	19.87	---	7.32	---
Total	17				
		Group V:V, male		Group VI:V, female	
Main Effects: Locations (A)	1	18.26	0.71	103.87	5.54
SES (D)	2	6.67	0.22	114.16	6.09
School Excellence (E)	2	19.07	0.74	9.29	0.49
Interactions: A x D	2	63.51	2.46	31.85	1.70
A x E	2	156.31	6.04	79.64	4.25
E x E	4	76.73	2.97	89.38	4.77
Residuals: A x D x E	4	25.86	---	18.76	---
Total	17				

is significant at better than .05 level in grade II, female. The main effect of school excellence is significant at .05 level, in grade I, male. No other main effects are significant in any other group. Among the interaction, only one, viz. between location and school excellence, is significant at .01 level in grade I, male, and at .05 level in grade II, female. No other interactions manage to reach significance in any other group. The inter-relationship of school attainment, with quality of schooling, which in turn is loaded in favour of urban-rural differential location, receives confirmation from the results of the analysis of variance.

6. <u>Achievement in Mathematics</u>

The results of the analysis of variance of the mathematics achievement test scores, obtained by different groups, have been shown in Table 17-6.

As with two previous measures, with this measure also, whatever main effects and interaction effects manage to reach level of statistical significance, are concentrated only in the same two groups, viz. grade I, male and grade II, female.

The main effect, location, is found to be significant at .05 level in both the groups; the same is true about the main effect, SES. The third main effect, school excellence, is significant at .01 level, in only grade I, male. One interaction effect, between location and school excellence, is highly significant, well beyond, .01 level, in grade I, male, but attains significance at .05 level only, in grade I, female. No other main effects, or interactions attain significance level in any other group.

7. <u>Time taken to complete mosaic designs</u>

The results of the analysis of variance of 'total time taken to complete the mosaic designs' obtained from the six different groups are shown in Table 17-7.

As with the previous three measures, with this measure also, the significant main effects and interaction effects are found mostly concentrated in the same two groups, grade I, male, and grade II, female.

The main effect, location, is significant at .05 level, in grade II, female, only. But the main effect, SES, is found to be significant, not only grade II, female, but also in grade V, female, but not in grade I, male, though.

Table 17-7

Analysis of variance of 'Time taken to complete Mosaic design' of different groups

Sources of Variation	DF	Mean Squares	F	Mean Squares	F
		Group I:I, male		Group II:I, female	
Main Effects: Locations (A)	1	5.35	2.75	17.37	4.45
SES (D)	2	6.93	3.55	9.24	2.37
School Excellence (E)	2	5.04	2.59	0.07	0.02
Interaction: A x D	2	0.76	0.39	2.10	0.54
A x E	2	21.43	10.99*	7.79	2.00
D x E	4	2.91	1.49	6.11	1.56
Residuals: A x D E	4	1.95	---	3.90	---
Total	17				
		Group III:II, male		Group IV:II, female	
Main Effects: Locations (A)	1	10.67	2.91	8.39	11.49*
SES (D)	2	7.75	1.59	7.61	10.42*
School Excellence (E)	2	6.56	1.35	1.41	1.97
Interactions: A x D	2	7.51	1.55	6.63	9.07*
A x E	2	28.63	5.89	9.07	12.40*
D x E	4	10.10	2.08	3.04	4.11
Residuals: A x D x E	4	4.86	---	0.73	---
Total	17				
		Group V:V, male		Group VI:V, female	
Main Effects: Locations (A)	1	12.17	1.10	16.28	6.93
SES (D)	2	5.33	0.48	20.27	8.63*
School Excellence	2	12.58	1.14	0.65	0.27
Interactions: A x D	2	15.64	1.42	7.53	3.20
A x E	2	49.18	4.46	12.75	5.42
D x E	4	28.49	2.58	10.35	4.40
Residuals: A x D x E	4	11.04	---	2.35	---
Total	17				

The interaction effect, between location and SES, is significant at .05 level, only in grade II, female. Another interaction effect, between location and school excellence, is however significant in both grade I, male, and grade II, female, both at .05 level. No other main effect, or interaction effect reaches significance level in any other group.

8. <u>Total Number of pieces used in the Mosaic Design</u>

The results of the analysis of variance of this measure derived from the mosaic test, for the six groups, have been shown in Table 17-8.

The trend that has been seen with the previous four measures, is found repeated in a more accentuated form, with this measure also. All the significant main effects, and interaction effects are to be found only in one group, viz. grade II, female, with one lone exception, which is, again, appropriated by grade I, male. All the three main effects, location, SES, and school excellence, are significant, and in only grade II, female. The first two are significant at well beyond .01 level, the third at better than .05 level, just failing to reach significance at .01 level. All the three interaction effects, between location and SES, between location and school excellence, and between SES and school excellence, are significant at better than .01 level, in grade II, female. Only the interaction effect between location and school excellence is significant at better than .01 level, in grade I, male. The variability within the remaining groups, is obviously too small to permit any of the main effects or interaction effects reach significance level. Why so much of generalized variability be shown in grade II, female group only is very difficult to account for.

9. <u>Number of sub-designs in the Mosaic Designs</u>

The results of the analysis of variance of this measure, also derived from the purely objective features of the mosaic designs constructed by the six different groups have been shown in Table 17-9.

A quick look at Table 17-9 shows, that there is a lone instance of a significant F ratio. In group III, i.e. grade II, male, the interaction effect between location and school excellence, is significant at .05 level. None of the remaining F ratios reaches significance level in any of the six groups.

Table 17-8

Analysis of variance of 'Total number of pieces used in Mosaic designs of different groups

Sources of Variation	DF	Mean Squares	F	Mean Squares	F
		Group I:I, male		Group II:I, female	
Main Effects: Locations (A)	1	16.34	3.53	3.45	0.28
SES (D)	2	27.31	5.89	68.16	5.45
School Excellence (E)	2	15.58	3.37	7.66	0.60
Interactions: A x D	2	9.69	1.66	13.18	1.04
A x E	2	125.19	27.69**	52.65	4.15
D x E	4	17.67	3.82	18.90	1.48
Residuals: A x D x E	4	4.63	---	12.69	---
Total	17				
		Group III:II, male		Group IV:II, female	
Main Effects: Locations (A)	1	28.75	0.99	37.58	31.58**
SES (D)	2	62.62	2.21	42.97	36.10**
School Excellence (E)	2	22.87	0.79	20.88	17.69*
Interactions: A x D	2	28.66	0.99	29.61	24.88**
A x E	2	110.65	3.85	105.77	89.63**
D x E	4	36.45	1.25	21.19	17.72**
Residuals: A x D E	4	28.84	---	1.19	---
Total	17				
		Group V:V, male		Group VI:V, female	
Main Effects: Locations (A)	1	9.83	0.48	19.87	1.05
SES (D)	2	38.91	1.90	78.82	4.16
School Excellence (E)	2	22.39	1.09	3.49	0.18
Interactions: A x D	2	25.82	1.21	22.23	1.17
A x E	2	115.82	5.67	107.70	5.68
D x E	4	55.79	2.73	60.34	3.17
Residuals: A x D x E	4	20.44	---	18.95	---
Total	17				

Table 17-9

Analysis of variance of 'Number of subdesigns' in mosaic designs of different groups

Sources of Variation	DF	Mean Squares	F	Mean Squares	F
		Group I:I, male		Group II:I, female	
Main Effects: Locations (A)	1	0.55	0.46	0.71	0.38
SES (D)	2	2.27	1.90	3.90	2.07
School Excellence (E)	2	0.49	0.41	2.48	1.31
Interactions: A x D	2	0.93	0.80	1.42	0.75
A x E	2	4.04	3.40	2.50	1.32
D x E	4	0.97	0.82	2.27	1.19
Residuals: A x D x E	4	1.19	---	1.90	---
Total	17				
		Group III:II, male		Group IV:II, female	
Main Effects: Locations (A)	1	0.03	0.18	0.20	0.44
SES (D)	2	0.67	3.94	1.31	3.10
School Excellence (E)	2	0.20	1.18	0.19	0.41
Interactions: A x D	2	0.44	2.65	0.29	0.65
A x E	2	1.22	7.25*	0.74	1.64
D x E	4	0.49	2.94	0.36	0.80
Residuals: A x D x E	4	0.16	---	0.45	---
Total	17				
		Group V:V, male		Group VI:V, female	
Main Effects: Locations (A)	1	0.05	0.31	0.00	0.005
SES	2	0.73	4.23	1.28	2.12
School Excellence (E)	2	0.41	2.41	0.79	1.30
Interactions: A x D	2	0.28	1.59	1.09	1.82
A x E	2	1.04	6.06	2.84	4.72
D x E	4	0.46	2.65	1.89	3.14
Residuals: A x D x E	4	0.17	---	0.61	---
Total	17				

Table 17-10

Analysis of variance of 'Area covered' by mosaic designs of different groups

Sources of Variation	DF	Mean Squares	F	Mean Squares	F
		Group I:I, male		Group II:I, female	
Main Effects: Locations (A)	1	60.90	2.41	10.04	0.29
SES (D)	2	69.41	2.35	178.82	4.92
School Excellence (E)	2	45.16	1.39	32.34	0.89
Interactions: A x D	2	29.14	1.15	17.84	0.49
A x E	2	340.55	13 50*	107.38	2.94
D x E	4	65.60	2.19	46.12	1.21
Residuals: A x D x E	4	25.27	---	361.38	---
Total	17				
		Group III:II, male		Group IV:II, female	
Main Effects: Locations (A)	1	194.39	0.29	183.43	58.18**
SES (D)	2	227.33	1.65	98.93	31.37**
School Excellence (E)	2	131.15	0.95	81.42	23.79**
Interactions: A x D	2	134.98	0.93	65.46	20.75*
A x E	2	470.47	3.47	265.54	84.18**
D x E	4	150.27	1.09	59.25	18.79*
Residuals: A x D x E	4	137.81	---	3.15	---
Total	17				
		Group V:V, male		Group VI:V, female	
Main Effects: Locations (A)	1	16.80	0.45	32.64	0.69
SES (D)	2	71.63	1.73	163.40	3.51
School Excellence (E)	2	34.86	0.84	8.02	0.17
Interactions: A x D	2	59.45	1.43	28.59	0.51
A x E	2	245.41	5.92	198.31	4.26
D x E	4	113.47	2.74	101.57	2.19
Residuals: A x D x E	4	41.44	---	46.50	---
Total	17				

10. Area covered by the Mosaic Designs

The results of the analysis of variance of this measure derived from the purely objective features of the mosaic designs constructed by the six groups have been shown in Table 17-10.

The trend shown with some of the previous measures is again found replicated with this measure also. All the significant F ratios are to be found only in one group, in grade II, female, with a lone exception, appropriated by grade I, male, which strictly falls along expected lines. All the three main effects, location, SES and school excellence, are found to be significant well beyond .01 level in grade II, female group only. The three interaction effects are also significant in the same group. The interaction between location and SES, and between SES and school excellence, are significant at .05 level. The interaction effect between location and school excellence, is significant at much beyond .01 level. This very interaction effect is also significant at .05 level in grade I, male. No other F ratio attains significance level in any other group.

11. Total Rating of Subjective features of Mosaic Designs

The results of the analysis of variance of this measure, which is derived from the qualitative features of the mosaic designs constructed by the six different groups have been shown in Table 17-11.

The results obtained from the analysis of variance of this measure are quite different from the previous ones. One of the three main effects, SES, is found to attain significance level in 4 groups out of six, viz. grade I, male, grade I, female; grade II, female, and grade V, female. Next, one interaction effect, between location and school excellence, is significant at .01 level in grade I, male, and at .05 level in grade II, male, grade II, female, and grade V, male groups. Lastly, another interaction effect, between SES and school excellence, is found to be significant at .05 level in two groups, viz. grade I, female, and grade V, female. Some of the differences appeared to be sex linked so far as this measure derived from the mosaic designs is concerned. This trend seems to be psychologically meaningful, as the rating of the design is based primarily upon their artistic and aesthetic qualities. Sex differentiation in artistic activities has been presumed to be a well known phenomenon. May be this

Table 17-11

Analysis of variance of 'Rating of qualitative features of mosaic designs' of different groups

Sources of Variation		DF	Mean Squares	F	Mean Squares	F
			Group I:I, male		Group II:I, female	
Main Effects:	Locations (A)	1	77.85	2.33	289.90	7.44
	SES (D)	2	336.82	10.11*	746.17	19.14**
	School Excellence (E)	2	148.01	4.44	234.53	6.01
Interactions:	A x D	2	61.01	1.83	77.43	1.99
	A x E	2	916.54	27.59**	120.00	3.08
	D x E	4	158.65	4.77	288.47	7.40*
Residuals:	A x D x E	4	33.31	---	38.97	---
	Total	17				
			Group III:II, male		Group IV:II, female	
Main Effects:	Locations (A)	1	5.58	0.08	384.19	5.27
	SES (D)	2	361.16	4.84	550.16	7.54*
	School Excellence (E)	2	203.07	2.75	46.79	0.64
Interactions:	A x D	2	143.95	1.92	57.21	0.79
	A x E	2	571.00	7.66**	732.35	10.04*
	D x E	4	257.33	3.47	225.28	3.89
Residuals:	A x D x E	4	74.53	---	72.93	---
	Total	17				
			Group V:V, male		Group VI:V, female	
Main Effects:	Locations (A)	1	12.13	0.12	358.85	4.74
	SES (D)	2	367.10	3.69	809.28	10.69*
	School Excellence (E)	2	231.67	2.33	209.89	2.77
Interactions:	A x D	2	218.96	2.20	87.41	1.16
	A x E	2	818.50	8.20*	289.29	3.82
	D x E	4	398.76	4.01	483.90	6.39*
Residuals:	A x D x E	4	99.38	---	75.70	---
	Total	17				

Table 17-12

Distribution of statistically significant, at 5% or better level, main effects and interaction effects among the six different sample groups

		Source of Variation						
		Main Effects			Interaction			Total
No.	Group	Location	SES	School Excellence	Location x SES	Location x School Excellence	SES x School Excellence	
		A	D	E	A x D	A x E	D x E	
1.	Grade I, male	2	5	4	-	10	2	23
2.	" I, female	-	2	-	-	1	1	4
3.	Grade II, male	-	-	-	-	5	-	5
4.	Grade II, female	5	9	3	2	10	4	33
5.	Grade V, male	-	1	-	-	4	-	5
6.	Grade V, female	-	3	-	-	-	1	4
	Total	7	20	7	2	30	8	74

finding is in line with this phenomenon.

We may like to summarize the findings about the statistical significance of main effects and interactions in different groups at this stage. Table 17-12 summarizes the position.

The distribution of statistically significant F ratios, among different main effects and interaction effects, and among the six groups, is very instructive. First, we note, among the 6 groups, 4 groups do not show much inherent variability. These groups are grade I, female, grade II, male, grade V, male and grade V, female. These have about 4 or 5 significant F ratios within the group. But grade I male, and grade II, female, are very different. The first group has 23 significant F ratios, and the second group has 33 significant F ratios, signifying a good deal of internal variability within the structure of the samples themselves.

Coming to the main effects we note, that SES has no less than 20 significant F ratios - quite in keeping with other findings. Location and school excellence have hardly one-third the number of significant F ratios. The interaction, location x SES, has only 2 significant F ratios, and even the interaction D x E has 8 significant F ratios. But, the interaction SES x School excellence has no less than 30 significant F ratios. This is an excellent confirmation of the conclusion that has been drawn earlier, that the joint influence of the home social-economic conditions, and the academic impact of the school provides the most systematic differentiation, in terms of academic and psychological growth of the children. No other influence is as potent, as this joint impact of the home and school. Confirmation of this well-known fact by the use of the fairly sophisticated statistical technique of analysis of variance is very satisfying indeed.

CHAPTER 18

Multivariate Prediction of Performance Variables

The nature of correlations between variables belonging to different categories has been studied in great detail in earlier chapters. Such correlational analysis has been essentially univariate – that is between only pairs of variables – each of them belonging to different categories, or to the same category. On the basis of zero-order correlations alone, it is possible to predict performance in one variable from knowledge of performance in another variable correlated to the former. Thus correlation between LinSES on one hand, and achievement in Hindi or Arithmetic on the other, can be used to predict performance on the better, by setting up appropriate regression equations, which make use of the correlation between the predictor and the criterion variable (the variable that is being predicted), and the standard deviations and means of both the variables. The efficiency of the level of prediction, which is measured in terms of proportion of the variance of the criterion variable accounted for, depends upon the square of the zero-order correlation between the predictor and the criterion variable. Thus, the higher the correlation between predictor and the criterion variable, the greater will the accuracy of prediction indexed by the square of the correlation coefficient between the two variables.

When we have got not one but several predictor variables available, each of which individually correlates with the criterion, then this fact can be utilised to obtain what is called the multivariate regression (= prediction) equation, for predicting the criterion variable in terms of a linear composite of the predictor variables, in which each of these are approximately weighted in terms of the correlation between each of these predictor variables with the criterion variable, and also the extent of intercorrelation among the predictor variables themselves. The weights attached to the predictor variables are called regression coefficients. By using a multivariate regression equation, the score in the criterion variable is predicted for each subject. The correlation between such predicted scores, and the actual scores obtained by the same subjects, is the multiple correlation, R, which is sought to be maximised, in the process of determining the appropriate regression coefficients to be attached to each of the predictor variables. This process is called multivariate regression analysis.

So far as the present study is concerned, from a

purely utilitarian standpoint, we would be interested in finding out how best can we predict performance of different groups of subjects, in the two school subjects. Hindi and mathematics, and in the mosaic test of imaginative organisations on the basis of whatever knowledge we may have about the family background faction of the subjects, and about the quality of schooling that they are receiving from the institution attended by them. Instead of using the different components of the family background variables separately, and the components of the school variables separately, we should use the two composite scales developed in this study, named LinSES and LinSEC, respectively. Using these two variables jointly we can increase the accuracy of our prediction of the criterion variable considerably.

Next, if we make use of our knowledge about the performance of these subjects in the intervening variables, and use them also additional predictor variables, along with LinSES and LinSEC, we stand to gain further in increasing our accuracy of prediction of the criterion variables. We have 5 intervening variables, of which only four have been used – because we should select either mental age or IQ, instead of both, as a measure of intelligence. Thus we can find out what is the gain in prediction accuracy, if six predictor variables are used, (LinSES, LinSEC, IQ, Social maturity, moral relativism, and sociometric status index) instead of only two (LinSES and LinSEC).

The increase in accuracy of prediction of the criterion variables (performance in Hindi, mathematics and mosaic test) by using six predictor variables over using only two predictor variables is of limited interest, which is rather scientific and theoretical in nature. From the more practical or utilitarian point of view, a more useful function will be to set up the regression equations that can be used for actually predicting scores on each of the three criterion variables, for any subject, for which such facts as sex, age grade, LinSES score, LinSEC score, and scores on the N intervening variables are known. In a later section of the present chapter, these regression equations, for each group of subjects, and each of the three criteria, have been reported, for ready-made use by teachers and administrators. Of course, these regression equations have not been cross-validated, and therefore considerable shrinkage in actual practice is to be expected.

Regression equation for only three criteria have

been developed. These three criteria are: Achievement in Hindi - total of three subscales; achievement in mathematics; and Rating of mosaic design, total of three rating scales. It was thought predicting subscale scores will be mere proliferation of work, but the equations themselves will be of limited use. Likewise, the most important feature of the mosaic design, in which insight will be maximal is its aesthetic-organisation quality, which is relatively more accurately estimated with the help of the composite score of the three rating scales. Interest in the number of pieces used, or time taken, may have scientific value, but of limited practical application.

In the first section, multiple correlations for the three criterion variables, both by the two-predictor regression, and six-predictor regression, are reported. In the next section, the regression equations are reported, using the six predictors. Lastly, a few comments are offered.

I. Multiple correlations from two-predictor and six-predictor regression equations for different groups of subjects.

We start with the most homogenous, and small groups homogenous with regard to sex, age-grade, and location of schools. Since these groups are usually small in size, the multiple regressions will not be very reliable, that is their standard errors of estimate will be high. The ten predictors in the 2-variable R are LinSES and LinSEC. The six variables in the six-variable R are LinSES, LinSEC, IQ, Social Maturity, Moral relativism, and Sociometric Status Index.

Smallest groups, homogenous with respect to age-grade, sex and location of schools.

The coefficient of multiple correlation, R, and its square, R^2, obtained by using two predictors, LinSES, and LinSEC only, and all the six predictors, for each of the three criteria, Hindi achievement total, mathematics achievement total, and rated quality of mosaic design for 12 elements - small, homogenous groups have been shown in Table 18-1.

Close examination of the values of R's and their squares for different small groups which are homogenous with respect to location of schools and sex of subjects will reveal quite a few interesting points, which are discussed below.

Table 18-1

Coefficients of multiple correlation and their squares, for three criterion variables, with two-variable and six-variable predictors, for twelve elementary, homogenous groups

Group	Hindi Achievement					[illegible] Achievement					Mosaic Design Quality				
	R_2	R_6	R_2^2	R_6^2	Gain	R_2	R_6	R_2^2	R_6^2	Gain	R_2	R_6	R_2^2	R_6^2	Gain
1. I,U,M.	740	786	548	618	.070	785	81[illegible]	616	66[illegible]	.050	402	468	162	219	057
2. I,U,F.	143	429	020	184	.164	365	565	134	320	186	330	396	109	157	.048
3. I,R,M.	283	355	080	126	.046	312	503	098	253	155	303	329	092	108	016
4. I,R,F.	499	692	249	479	.230	356	692	127	479	352	184	237	034	049	015
5. II,U,M.	545	675	298	456	.157	316	507	099	257	.158	379	461	144	213	069
6. II,U,F.	507	687	248	472	.224	175	641	031	411	.280	233	469	054	220	.166
7. II,R,M.	281	471	079	221	142	311	389	098	151	053	226	296	051	088	037
8. II,R,F.	198	681	039	163	424	506	700	256	491	235	083	208	007	043	036
9. V,U,M.	606	690	433	177	044	423	5[illegible]1	[illegible]79	315	136	340	498	116	248	132
10. V,U,F.	293	658	086	133	347	[illegible]39	72[illegible]	175	526	351	110	491	012	241	119
11. V,R,M.	270	448	073	201	128	1[illegible]8	[illegible]	[illegible]36	224	183	149	199	023	040	017
12. V,R,F.	496	700	247	490	24[illegible]	463	70[illegible]	[illegible]	490	257	080	377	006	142	156

R_2 = Multiple R with 2 predictor variables

R_6 = " R " 6 " "

U = Urban R = Rural M = Male F = Female

Decimal points have been omitted.

(c) At first sight it becomes quite clear that for the three criteria the size of R values is similar for Hindi and mathematics achievement, but that for the ratings of mosaic designs is systematically lower. First, let us consider the values of R obtained by using two predictor variables only. The frequencies of different ranges of R values are as follows for the three criterion variables:

Range of R values	Hindi Achievement	Mathematics Achievement	Mosaic Quality
.000 – .099	–	–	2
.100 – .199	2	2	3
.200 – .299	4	–	2
.300 – .399	–	5	4
.400 – .499	2	3	1
.500 – .599	2	1	–
.600 – .699	1	–	–
.700 – .799	1	1	–
Total	12	12	12

The smallest R for Hindi achievement is .143, and the highest is .740, among 12 small groups; likewise, the smallest R for Mathematics achievement is .175 and the highest is .785; but the smallest R for mosaic design rating is .080, and the highest is only .402. Again, the average (simple) of the 12 R's for Hindi achievement is .405, the same for mathematics achievement is .387, and the same for mosaic design rating is .235.

Next, let us consider the values of R obtained by using six predictor variables instead of only two. The frequencies of the different ranges of R values are as follows for the three criterion variables:

Range of R values	Hindi Achievement	Mathematics Achievement	Mosaic Quality Rating
.100 – .199	–	–	1
.200 – .299	–	–	3
.300 – .399	1	1	3
.400 – .499	3	1	5
.500 – .599	–	4	–
.600 – .699	6	2	–
.700 – .799	2	3	–
.800 – .899	–	1	–
Total	12	12	12

Of course, all R values increase in size (the amount of increase varying from group to group), because of using 6 predictor variables instead of only 2. Now, for Hindi achievement, the number of R's falling between .300 to .599 is only 4, compared to 8 which fall between .600 and .799. Likewise, for mathematics achievement also, the number of R's falling between .300 to .599 is 6, compared to 6 which fall between .600 and .899. For mosaic design rating, all the R's fall between .100 and .499. The average value of 12 R's for Hindi achievement is .606, the same for mathematics achievement is also .606, but the same for mosaic design rating is only .370. There is no denying, that so far as small homogeneous groups are concerned such as boys or girls of the same age-grade, and belonging to school in the same type of location, one can predict very well both Hindi achievement and mathematics achievement, if knowledge of the type of school, and of the family background is combined with test performance in intelligence, social maturity, moral development and popularity are used appropriately. Prediction of the quality of their mosaic design will not be so efficient though.

We may first note, that using of 4 additional variable of the intervening category, invariably raise the amount of predicted variance of the criterion variable, but the magnitude of this increase is erratic, and unsystematic, as the distribution of the frequencies of different ranges of the proportion of R^2 values will bear out:

% gain in R^2 value	Hindi Achievement	Mathematics Achievement	Mosaic Design
0 to 9.9%	3	2	7
10 to 19.9%	4	5	4
20 to 29.9%	3	3	–
30 to 39.9%	1	2	–
40 to 49.9%	1	–	1
Total	12	12	12

The average gain in predicted variance (difference between R_2^2 and R_6^2) for Hindi achievement is 18.5%, for mathematics achievement is 20.0% and for the mosaic design is 7.3% only. Some of the spectacular gains may be cited – in Grade II, rural female group, the 2-predictor R is only .198, which reaches .681 if all the six predictors are used, meaning a gain of 42.4% of predictable variance of the criterion. Another spectacular case is that of the mathematics achievement R in Grade I, rural female group. Here the 2-variable R is .356, but the

six-variable R goes to .692, meaning a gain of 35.2% in predicted variance. Similar gains are found in Grade V, Urban, female group, for both Hindi achievement R and mathematics achievement R; in the former the R increases from .293 when 2 predictor variables are used to .658 when six are used; in the latter, the corresponding R values are .419 and .725.

It is a little strange, that the increase in R values, if 6 predictors are used instead of only 2, appears to be greater for female groups, both in rural and urban locations, and for both the criteria - Hindi and mathematics achievement. The conclusion that is forced upon us is this:

> a large part of the variance of performance in Hindi and mathematics, for females, is contributed by inner psychological factors like intelligence, social maturity, moral values, and social acceptance, but in the male students, these intervening variables play a relatively minor role. Why it should be so, is not easy to explain at this stage. But this is an important finding. Of course, the need for caution in accepting such findings outright cannot be overstressed - the R values, despite their fairly moderate size, are still very unstable, and have capitalized upon a lot of error variance as well.

(2) Fairly large groups, homogenous with respect to age-grade, and one more factor like sex or location, and heterogenous with respect to the remaining factor, location or sex. As in the case for studying significance of groups means of different variables and correlational analysis of zero-order correlation coefficients, the effect of increase in sample size concomitant with increasing heterogeneity of the groups with respect to one of the two factors, sex or location on the multiple correlation coefficients can be studied. One type of grouping is possible by combining subjects of both sexes, of the same grade together, but keeping locations separate; the other type of grouping is to combine across locations, but keeping the sexes separate. In this way six + six = twelve groups are obtained, for which the obtained R values both for 2-predictor variables and for 6-predictor variables, for all the three criteria are shown in Table 18-2.

First, we note again that the R values, for the mosaic design quality have tended to be much lower than the same for either Hindi achievement or Mathematics achievement - the

Table 18-2

Coefficients of multiple [illegible] and their squares, for thr[illegible] criterion [illegible], with two-variable and six-variable predictors, for [illegible] larger groups, hetorogenous with respect to [illegible], sex or location of [illegible]

Group	Hindi Achievement					Maths Achievement					Mosaic Design				
	R_2	R_6	R_2^2	R_6^2	Gain	R_2	R_6	R_2^2	R_6^2	Gain	R_2	R_6	R_2^2	R_6^2	Ga[illegible]
13. I,M+F,U	537	537	288	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	054	340	417	116	174	[illegible]
14. I,M+F,R	362	[illegible]	131	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	220	270	048	073	[illegible]
15. II,M+F,U	551	671	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	321	414	103	172	[illegible]
16. II,M+F,R	183	460	[illegible]	212	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	144	237	021	056	[illegible]
17. V,M+F,U	557	634	310	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	177	403	031	162	[illegible]
18. V,M+F,R	205	485	042	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	146	152	021	023	[illegible]
19. I,U+R,M	535	595	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	341	365	116	134	[illegible]
20. I,U+R,F	270	430	073	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	140	289	033	083	[illegible]
21. II,U+R,M	442	571	195	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	264	332	070	110	[illegible]
22. II,U+R,F	458	630	210	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	183	377	033	142	
23. V,U+R,M	428	527	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	133	194	018	038	
24. V,U+R,F	350	649	122	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	317	104	404	011	163	

R_2 = Multiple R with 2 [illegible] variables

R_6 = " R " [illegible] " "

I,M+F,U = [illegible] subjects of [illegible]

II,U+R,F = [illegible] II, [illegible] of both urban [illegible]

Decimal [illegible]

difference between the two latter sets not fairing any one systematically. The frequencies of 2-predictor for different ranges of R values are as follows:

Range of R Values	Hindi Achievement	Mathematics Achievement	Mosaic Quality
.100 - .199	1	2	7
.200 - .299	2	5	2
.300 - .399	2	3	3
.400 - .499	3	-	-
.500 - .599	4	1	-
.600 - .699	-	1	-
Total	12	12	12

So far as 2-predictor R's are concerned, the differences between those for Hindi achievement and mathematics achievement are unsystematic; there are 8 groups, in which the R's for Hindi achievement are greater than the corresponding R's for mathematics achievement; for the remaining four groups the reverse is the case.

The simple average value of 12 R's for Hindi achievement is .406; the same for mathematics achievement is .321; and the same for mosaic design quality is .213. It is also clear that the single average of the R values for groups which are homogenous with respect location, but heterogenous with respect to sex, are slightly but systematically smaller, compared to those for groups which are homogenous with respect to sex, but heterogenous with respect to location. Thus, the average R's for the six groups homogenous with respect to location are .399, .305, for achievement in Hindi and Mathematics respectively; the corresponding average R values are .414 and .337 for groups homogenous with respect to sex. This trend is reversed for the mosaic test R's, though. As with smaller groups, considerable improvement in the R values takes place when 4 additional variables are used along with the first two predictor variables, as evidenced by the frequencies of R's in different ranges of values, for all the three criteria, as shown below:

Range of R values	Hindi achievement	Mathematics achievement	Mosaic Rating
.100 - .199	-	-	2
.200 - .299	-	-	3
.300 - .399	-	2	3
.400 - .499	4	4	4
.500 - .599	4	3	-
.600 - .699	4	3	-
Total	12	12	12
Average R	.553	.519	.329

The increase in 6-predictor R values for Hindi achievement is somewhat greater than that for mathematics achievement. For Hindi achievement the minimum R value is .4?0 and the maximum is .671; the minimum R value for mathematics achievement is .318, and the maximum is [illegible]. The minimum R value for the mosaic design is .1?2, and the maximum is .417.

What about gain in accounting [illegible] predicted variance, when 6 predictors are used, instead [illegible] Close examination of figures given in Table [illegible] will show that the variability in the value of gains [illegible] reduced considerably. The highest gains are 31.7% in grade V, urban + rural, female group, for mathematics, the [illegible] for grade II, urban + rural, female group for mathematics achievement, followed by 29.9% for grade V, urban + rural, female group again, for Hindi achievement. The frequencies of different ranges of gains in R values for six-predictors over two predictors, for the three criteria are shown below:

% gains in R^2 value	Hindi achievement	Mathematics achievement	Mosaic Design
0% to 9.9%	5	4	9
10% to 19.9%	6	4	3
20% to 29.9%	1	2	-
30% to 30.9%	-	2	-
	12	12	12

Obviously the gain has been greater for mathematics achievement than for Hindi achievement. It is least for the mosaic design. The average gain in R values for Hindi achievement is 13.1%; the same for mathematics achievement is 15.8%; and the same for mosaic design is only 5.9%.

Again, the average for gains in R value for six groups homogenous with respect to Location are 11.3%, 14.9%

and 5.3% for Hindi achievement, mathematics achievement and mosaic design, respectively; the corresponding gain values in R's for groups homogenous with respect to sex are 15.0%, 16.6% and 6.6% respectively.

Since these R values are based upon data obtained from fairly large groups, their stability may be supposed to have increased considerably. This is confirmed by the considerable amount of shrinkage that has occurred in the range of both the sets of R values, - one obtained from two predictors, and the other from six predictors. Let us recall that the ranges of 2-predictor R values, for the smallest, 12 primary groups, were .143 to .740 for Hindi achievement, .175 to .785 for mathematics achievement, and .80 to .402 for mosaic design rating. The same ranges for the 12, somewhat larger, and less homogenous groups are - .183 to .557 for Hindi achievement, .124 to .603 for mathematics achievement, and .104 to .341 for mosaic design rating. There is cutting off at both lower and higher ends.

The situation is similar with the 6-predictor R values. Here the ranges of the R values for the smallest 12 primary groups, one .355 to .786 for Hindi achievement, .389 to .816 for mathematics achievement, and .208 to .491 for mosaic design ratings. The same R values for the larger, less homogenous groups, are .430 to .671 for Hindi achievement, .318 to .666 for mathematics achievement, and .152 to .417 for the mosaic design ratings. Here too the cutting off takes place at both lower and upper ends, indicating curtailment of vigorous fluctuations due to sampling factors.

(3) The largest groups, heterogenous with respect to both sex and location, and homogenous with respect only to age-grade.

The largest groups are those which consist of all subjects, whether boys or girls; and whether drawn from urban or local schools, belonging only to the same age-grade. The group size increases to 204 for grade I, 188 for grade II and 211 for grade V. For these three heterogenous age-grade groups the values of R's, and their squares, for each of the three criterion variables are shown in Table 18-3.

It will be seen, that the stabilization phenomenon that was mentioned above, shows up more prominently in these large, heterogenous groups. The three 2-predictor R values for Hindi are now .402, .456, .500 for grades I, II and V respectively. For Mathematics achievement the R values are

Table [illegible]

Co[illegible]ficients of multiple [illegible] and their squares, for three criterion variables, with two-variable and six-variable predictors, for [illegible] largest groups of three age-grades, heterogeneous with respect to sex, as well as location of schools

Group	Hindi Achievement					Maths. Achievement					Mosaic Design				Quali[illegible]
	R_2	R_6	R_2^2	R_6^2	Gain	R_2	R_6	R_2^2	R_6^2	Gain	R_2	R_6	R_2^2	R_6^2	G[illegible]
25. I,M+F,U+R	402	[illegible]	[illegible]	[illegible]	070	[illegible]	[illegible]	[illegible]	[illegible]	092	295	311	087	097	[illegible]
26. II,M+F,U+R	456	585	[illegible]	342	[illegible]	[illegible]	450	[illegible]	128	[illegible]	249	302	062	091	[illegible]
27. V,M+F,U+R	500	[illegible]	[illegible]	297	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	137	123	218	015	047	[illegible]

R_2 = Multiple R with [illegible] predictor variables

R_6 = " R " [illegible] " "

I, M+F, U+R = Grade I, all [illegible], male and female of urban and rural schools

Decimal points have been omitted.

.493, .244 and .262, for the three grades I, II and V respectively. For the mosaic designs, the corresponding R values are .295, .249 and .123. It is noteworthy, that while there is a systematic increase in Hindi achievement R values, as we go from grade I through grade II to grade V, the reverse is the case with mathematics achievement, and mosaic design ratings.

What about the 6-predictor R values? For Hindi achievement, the R values are .488, .525, .545, for grades I, II and V respectively; for mathematics achievement the corresponding R values are .579, .358 and .506; for mosaic designs, again, the corresponding R values are - .311, .302 and .218. It is to be noted that both for mathematics and Hindi, R values for Grade V are greater than those for Grade II. The shrinkage in the R values, by cutting off from both ends, that are seen here, is obviously due to progressive elimination of error variance due to sampling fluctuations, from the total, predicted variance. The R values are not very high, but they are quite stable, and contain not much error variance. We may expect the extent of shrinkage to be quite low, if revalidation is done by replicating the study on subsequent samples. This would not be so, if the R values are sought to be validated by using the smallest, primary groups, homogenous with respect to sex, and location, besides age-grade.

II. Regression Equations for predicting Performance in the Criterion Variables

While the R values have primarily scientific and theoretical implications, the regression equations are of more practical utility, because these are meant to be used for predicting scores on the criterion variables, if the predictor tests are administered upon similar groups, and the results of their performance are made use of in prediction. For each of the primary groups, as well as the 12 largest heterogenous groups, and the three largest age-group groups, three separate regression equations have been developed, for predicting the score in each of the three criterion variable. These equations use some common subscript which would be described first.

The mult... regression equation, in the standard score form, is

$$y' = {}_1x_1 + {}_2x_2 + {}_3x_3 + \cdots {}_nx_n$$

The multiple regression equation, in the standard score form, is

$$y = {}_1x_1 + {}_2x_2 + {}_3x_3 + \ldots\ldots {}_nx_n,$$

where, y = the predicted or estimated score in the criterion variable; ${}_1, {}_2 \ldots\ldots {}_n$, are the regression coefficients or beta-weights, to be attached to each of the predictor variables $x_1, x_2, x_3 \ldots\ldots x_n$

$x_1, x_2, x_3 \ldots\ldots x_n$ are the predictor variables, in standardized form.

The equivalent, raw-score form for the regression equation is

$$Y = B_1X_1 + B_2X_2 + B_3X_3 \ldots\ldots B_nY_n + C.$$

Here Y' = the estimated or predicted score on the criterion variable.

$B_1, B_2 \ldots B_n$ are regression coefficients or b-weights to be used with the raw score predictor variables.

$B_1 = {}_1 \cdot \frac{y}{x_1}$, where ${}_1$ is the beta-weight in standardized score form, y is the standard deviation of the criterion variable Y, and x_1 is the standard deviation of predictor variable X_1, and so on.

And $C = Y - (B_1 \cdot X_1 + B_2 \cdot X_2 \ldots\ldots B_nX_n)$.

C is the constant term, for the raw score form of the equation, where $\bar{X}_1, \bar{X}_2 \ldots\ldots \bar{X}_n$ etc. are the means of the variables $X_1, X_2 \ldots\ldots X_n$, and Y is the mean of the criterion variable Y.

Now, we have used the same six predictors in all our prediction equations, for predicting the three criterion variables. So we can use the same notations and subscripts, which will be common to all the 81 different regression equations (27 groups x 3 criteria = 81 equations).

The notation and subscript system

The three criterion variables are:

Y'_H = Estimated or predicted score in the Hindi achievement test (composite of 3 tests)

Y'_M = Estimated or predicted score in the mathematics test.

Y'_R = Estimated or predicted score in the rating scales for rating the qualitative attributes of the mosaic designs (Total of 3 subscales).

The six predictor variables are:

X_1 = Raw score from the LinSES scale (linear, weighted composite of the socio-economic and family background schedule scales).

X_2 = Raw score from the LinSEC scale (linear, weighted composite of the school equivalent and facilities scales).

X_3 = Raw score for IQ obtained from the Porteus Maze test.

X_4 = Raw score for social maturity scale.

X_5 = Raw score from moral relativism (composite of 3 scales).

X_6 = Raw score of sociometric status index test.

This system of subscript remains unchanged in the set of 81 equations developed. In all the prediction equations, the actual, computed b-coefficients and the actual, computed constant terms are also given. For any subject, his expected score on Hindi achievement, mathematics achievement, or in mosaic design can be computed by plugging in the scores obtained by him in the six predictor variables, in the appropriate equation depending upon the age-grade he belongs, and then by calculating the Y' value. This estimated Y' value is expected to correlate maximally with his actual performance in the criterion test. The coefficient of multiple correlation is actually an estimate of this correlation between the actual score and predicted score. The regression weights have been so chosen as to maximize this correlation coefficient.

The prediction equations are now reproduced below criterionwise for the 27 groups that have been conceptualized in this study.

A. Regression Equations for predicting performance in Hindi (Y'_H) for different groups, varying in size and homogeneity.

(1) <u>Smallest primary groups</u>, homogenous with respect to age-grade, sex and location of schools.

<u>Group</u>	<u>Regression Equation</u>
1. Grade I, Urban, Male	$Y'_H = .95X_1 + 10.88X_2 + .33X_3 - .01X_4 + 1.46X_5 (-.00X_6) - 86.97.$
2. Grade I, Urban, Female	$Y'_H = .43X_1 - 3.76X_2 + .62X_3 (.00X_4) - .10X_5 + .01X_6 + 9.82.$

3. Grade I, Rural, Male $Y'_H = 1.80X_1 + 2.63X_2 + .10X_3 + (.00X_4) + 1.87X_5 + .04X_6 - 33.76$.

4. Grade I, Rural, Female $Y'_H = 5.26X_1 + 16.05X_2 + .64X_3 + .04X_4 - .75X_5 - .47X_6 - 203.33$

5. Grade II, Urban, Male $Y'_H = 1.73X_1 + 1.38X_2 + .35X_3 + .02X_4 - .59X_5 - .03X_6 - 41.62$

6. Grade II, Urban, Female $Y'_H = 1.29X_1 + 1.42X_2 + .38X_3 + .01X_4 + .59X_5 + .13X_6 - 36.78$

7. Grade II, Rural, Male $Y'_H = 1.29X_1 - 2.85X_2 + .21X_3 + .03X_4 + 1.02X_5 + .02X_6 - 33.5$

8. Grade II, Rural, Female $Y'_H = -.44X_1 - 1.16X_2 + .34X_3 - .01X_4 + 2.42X_5 + .03X_6 - 4.41$

9. Grade V, Urban, Male $Y'_H = .06X_1 +$ [illegible]$.70X_2 + .15X_3 + (.00X_4) + .68X_5 + .03X_6 - 46.80$

10. Grade V, Urban, Female $Y'_H = -.18X_1 + 1.71X_2 + .07X_3 - .01X_4 + 1.09X_5 + .10X_6 + 14.58$

11. Grade V, Rural, Male $Y'_H = .68X_1 - 2.08X_2 + .08X_3 + (.00X_4) + .67X_5 + .09X_6 +$ [illegible]

12. Grade V, Rural, Female $Y'_H = 1.04X_1 + 1.99X_2 + .07X_3 - (.00X_4) + 1.75X_5 + .04X_6 - 22.69$.

(2) Relatively larger groups, heterogenous with respect to either sex or location, but homogenous with respect to age-grade and the remaining variable.

1. Grade I, male+female, Urban $Y'_H = 1.24X_1 + .30X_2 + .39X_3 - .01X_4 + .97X_5 + .02X_6 - 17.08$

2. Grade I, male+female, rural $Y'_H = 2.31X_1 + 6.27X_2 + .29X_3 - (.00X_4) + 1.41X_4 - .08X_6 - 68.29$

3. Grade II, male+female, Urban $Y'_H = 1.75X_1 + .96X_2 + .36X_3 + .01X_4 + .12X_5 + .04X_6 - 40.86$

4. Grade II, male+female, rural $Y'_H = .78X_1 - 2.36X_2 + .26X_3 + .01X_4 + 1.51X_5 + .01X_6 - 21.48$

5. Grade V, male+female, Urban $Y'_H = .06X_1 + 4.43X_2 + .17X_3 - (.00X_4) + .92X_5 + .03X_6 - 16.83$

6. Grade V, male+female, rural $Y'_H = .61X_1 - 1.04X_2 + .12X_3 + (.00X_4) + 1.21X_5 + .08X_6 - 3.68$

7. Grade I, Urban+rural, male — $Y'_H = 1.80X_1 + 2.26X_2 + .28X_3 - (.00X_4) + 1.31X_5 + .01X_6 - 48.16$

8. Grade I, Urban+rural, female — $Y'_H = (.00X_1) + 5.00X_2 + .42X_3 - .02X_4 + .78X_5 - .10X_6 - 8.23$

9. Grade II, Urban+rural, male — $Y'_H = 1.79X_1 - .47X_2 + .28X_3 + .02X_4 + .25X_5 - .01X_6 - 36.90$

10. Grade II, Urban+rural, female — $Y'_H = .98X_1 + 2.86X_2 + .35X_3 + (.00X_4) + 1.17X_5 + .03X_6 - 39.48$

11. Grade V, Urban+rural, male — $Y'_H = .79X_1 + 1.48X_2 + .13X_3 - (.00X_4) + .88X_5 + .05X_6 - 7.63$

12. Grade V, Urban+rural, female — $Y'_H = .15X_1 + 1.48X_2 + .09X_3 + (.00X_4) + 1.26X_5 + .07X_6 - 8.12$

(3) Largest groups, heterogenous, with respect to sex and location, and homogenous with respect to only age-grade.

1. Grade I, Male+female, Urban+rural — $Y'_H = 1.31X_1 + 2.21X_2 + .30X_3 - .01X_4 + 1.35X_5 - .03X_6 - 24.64.$

2. Grade II, Male+female, Urban+rural — $Y'_H = 1.55X_1 + 1.06X_2 + .30X_3 + .01X_4 + .60X_5 + .01X_6 - 36.64$

3. Grade V, Male+female, Urban+rural — $Y'_H = .48X_1 + 1.51X_2 + .13X_3 + (.00X_4) + 1.11X_5 + .06X_6 - 10.98$

B. Regression equations for predicting performance in Mathematics (Y'_M) for different groups varying in size and homogeneity.

(a) Smallest primary groups, homogenous with respect to age-grade, sex and location of schools.

Group	Regression Equations
1. Grade I, Urban, male	$Y'_M = .46X_1 + 4.74X_2 + .10X_3 - (.00X_4) + .48X_5 - .01X_6 - 34.85$
2. Grade I, Urban, female	$Y'_M = .35X_1 + .35X_2 + .18X_3 + .01X_4 - .59X_5 - .03X_6 - 6.75$
3. Grade I, Rural, male	$Y'_M = .70X_1 - .83X_2 + .08X_3 - (.007X_4) + 1.41X_5 - (.008X_6) - 2.601$
4. Grade I, Rural, female	$Y'_M = 1.51X_1 + 2.05X_2 + .30X_3 + .01X_4 + .04X_5 - .07X_6 - 64.03$

5. Grade II, Urban, male $Y'_M = .28X_1 - .25X_2 \quad .08X_3 + (.0015X_4) - .21X_5 + .01X_6 + .49$

6. Grade II, Urban, female $Y'_M = .02X_1 - .43X_2 + .07X_3 - (.004X_4) + .84X_5 + .04X_6 - .93$

7. Grade II, Rural, male $Y'_M = .29X_1 - .92X_2 - .01X_3 + (.005X_4) + .21X_5 + .02X_6 + 2.54$

8. Grade II, Rural, female $Y'_M = .27X_1 + 1.26X_2 + .03X_3 - (.0047X_4) + .69X_5 - .04X_4 - 5.33$

9. Grade V, Urban, male $Y'_M = .18X_1 - .59X_2 + .07X_3 - (.0019X_4) + .32X_5 - (.0001X_6) + 1.41$

10. Grade V, Urban, female $Y'_M = .17X_1 - .25X_2 + .02X_3 - (.008X_4) - (.001X_5) + .07X_6 + 12.06$

11. Grade V, Rural, male $Y'_M = .11X_1 - .26X_2 + .04X_3 + (.0009X_4) + .23X_5 + .04X_6 - 2.14$

12. Grade V, Rural, female $Y'_M = .26X_1 + .52X_2 + .02X_3 + (.044X_4) + .53X_5 + .02X_6 - 4.04$

(2) Relatively larger groups, heterogenous with respect to either sex or location, but homogenous with respect to age-grade and the remaining variable.

1. Grade I, Male+Female, Urban $Y'_M = .58X_1 + 1.38X_2 + .11X_3 + (.004X_4) + .08X_5 - (.016X_6) - 13.73$

2. Grade I, Male+female, rural $Y'_M = .65X_1 - .38X_2 + .15X_3 - (.0035X_4) + 1.27X_5 - .02X_6 - 15.52$

3. Grade II, Male+female, Urban $Y'_M = .21X_1 - .63X_2 + .085X_3 - - (.0004X_4) + .23X_5 + .02X_6 + .53$

4. Grade II, Male+female, Rural $Y'_M = .25X_1 - .12X_2 - (.001X_3) + (.00X_4) + .40X_5 - (.004X_6) + 2.64$

5. Grade V, Male+female, Urban $Y'_M = .14X_1 - .40X_2 + .06X_3 - (.002X_4) + .23X_5 + .01X_6 + 2.35$

6. Grade V, Male+female, Rural $Y'_M = .09X_1 - .08X_2 + .04X_3 - (.00X_4) + .39X_5 + .04X_6 - 3.56$

7. Grade I, Urban+rural, male $Y'_M = .86X_1 + .69X_2 + .10X_3 - (.0007X_4) + .82X_5 - (.007X_6) - 16.86$

8. Grade I, Urban+rural, female — $Y'_M = .19X_1 + 1.85X_2 + .17X_3 + (.0026X_4) + .29X_5 - .03X_6 - 16.21$

9. Grade II, Urban+rural, male — $Y'_M = .34X_1 - .56X_2 + .03X_3 + (.0025X_4) - (.006X_5) + .01X_6 + 2.59$

10. Grade II, Urban+rural, female — $Y'_M = -.02X_1 + .30X_2 + .05X_3 - (.001X_4) + .82X_5 - .01X_6 - 4.54$

11. Grade V, Urban+rural, male — $Y'_M = .17X_1 - .13X_2 + .05X_3 + (-.00X_4) + .28X_5 + .02X_6 - 2.29$

12. Grade V, Urban+rural, female — $Y'_M = .10X_1 - .01X_2 + .03X_3 - (.004X_4) + .28X_5 + .04X_6 + 2.45$

(3) Largest groups, heterogenous with respect to sex and location, and homogenous with respect only to age-grade.

1. Grade I, Male+female, Urban+rural — $Y'_M = .63X_1 + .95X_2 + .11X_3 + (.00X_4) + .67X_5 - .02X_6 - 15.76$

2. Grade II, Male+female, Urban+rural — $Y'_M = .21X_1 - .22X_2 + .04X_3 + (.00X_4) + .30X_5 + (.005X_6) + .41$

3. Grade V, Male+female, Urban+rural — $Y'_M = .13X_1 - .11X_2 + .05X_3 - (.00X_4) + .30X_5 + .02X_6 - 1.27$

C. Regression equations for predicting performance in mosaic test - total rating of quality of design, Y'_R, for different groups varying in size and homogeneity.

(1) Smallest primary groups, homogenous with respect to age-grade, sex and location of schools

Group	Regression Equations
1. Grade I, Urban, male	$Y'_R = 2.25X_1 - 2.93X_2 + .44X_3 - .01X_4 + .36X_5 + .17X_6 + 236.51$
2. Grade I, Urban, female	$Y'_R = 2.49X_1 - 11.53X_2 + .42X_3 + .03X_4 - 1.87X_5 + .22X_6 + 273.29$
3. Grade I, Rural, male	$Y'_R = 1.88X_1 + 12.21X_2 - .20X_3 + .01X_4 - 1.15X_5 + .07X_6 + 211.76$
4. Grade I, Rural, female	$Y'_R = -1.38X_1 + 8.72X_2 + .67X_3 + .07X_4 + 3.08X_5 + .40X_6 + 67.57$

5. Grade II, Urban, male $Y'_R = 3.20X_1 - 4.44X_2 + .47X_3 - (.00X_4) + .79X_5 + .23X_6 + 223.71$

6. Grade II, Urban, female $Y'_R = 1.01X_1 - .28X_2 + .60X_3 - (.02X_4) + 3.74X_5 - .35X_6 + 221.61$

7. Grade II, Rural, male $Y'_R = 1.39X_1 + 5.27X_2 + .21X_3 + .04X_4 + 1.84X_5 + .16X_6 + 222.99$

8. Grade II, Rural, female $Y'_R = 2.97X_1 + 9.53X_2 + .41X_3 + .07X_4 + 3.76X_5 + .25X_6 + 309.29$

9. Grade V, Urban, male $Y'_R = 1.14X_1 + 7.27X_2 + .26X_3 + .03X_4 + 1.62X_5 + .10X_6 + 346.37$

10. Grade V, Urban, female $Y'_R = - 1.37X_1 + 8.33X_2 + .51X_3 + .04X_4 + 1.04X_5 + .18X_6 + 198.53$

11. Grade V, Male, rural $Y'_R = - 1.14X_1 + 6.92X_2 - .06X_3 - .01X_4 - .27X_5 - .03X_6 + 339.64$

12. Grade V, Female, rural $Y'_R = .30X_1 - 3.29X_2 + .26X_3 - .03X_4 + 1.24X_5 + .32X_6 + 326.87$

(2) Relatively larger groups, heterogenous with respect to either sex or location, but homogenous with respect to age-grade.

1. Grade I, Male+female, Urban $Y'_R = 2.47X_1 - 7.57X_2 + .40X_3 + .01X_4 - .63X_5 + .18X_6 + 257.63$

2. Grade I, Male+female, rural $Y'_R = .82X_1 + 9.09X_2 + .09X_3 + .04X_4 + .74X_5 + .11X_6 + 162.41$

3. Grade II, Male+female, Urban $Y'_R = 2.24X_1 - 3.16X_2 + .49X_3 - .02X_4 + 2.00X_5 + .01X_6 + 234.76$

4. Grade II, Male+female, rural $Y'_R = .24X_1 + 7.25X_2 + .10X_3 + .02X_4 - 2.26X_5 - .10X_6 + 250.66$

5. Grade V, Male+female, Urban $Y'_R = .99X_1 - 3.21X_2 + .56X_3 + .04X_4 - .29X_5 + .67X_6 + 249.70$

6. Grade V, Male+female, rural $Y'_R = - .66X_1 + 5.18X_2 - .01X_3 - .01X_4 - .21X_5 + .04X_6 + 327.84$

7. Grade I, Urban+rural, male — $Y'_R = 1.85X_1 + 3.67X_2 + .21X_3 + (.00X_4) - .43X_5 + .08X_6 + 219.05$

8. Grade I, Urban+rural, female — $Y'_R = .88X_1 - 1.65X_2 + .33X_3 + .02X_4 + .95X_5 + .28X_6 + 209.26$

9. Grade II, Urban+rural, male — $Y'_R = 1.62X_1 + 5.35X_2 + .31X_3 + .01X_4 - .63X_5 + .10X_6 + 201.61$

10. Grade II, Urban+rural, female — $Y'_R = 1.31X_1 - 1.15X_2 + .42X_3 - .02X_4 + 2.44X_5 - .31X_6 + 251.69$

11. Grade V, Urban+rural, male — $Y'_R = .37X_1 + 4.62X_2 + .21X_3 + .02X_4 - .55X_5 + .02X_6 + 270.32$

12. Grade V, Urban+rural, female — $Y'_R = - .42X_1 + 4.65X_2 + .32X_3 + .01X_4 + .74X_5 + .28X_6 + 250.45$

(3) Largest groups, heterogenous with respect to sex and locations and homogenous with respect only to age-grade.

1. Grade I, Male+female, urban+rural — $Y'_R = 1.56X_1 + 1.60X_2 + .22X_3 + .01X_4 + .12X_5 + .13X_6 + 219.82$

2. Grade II, Male+female, urban+rural — $Y'_R = 1.51X_1 + 2.99X_2 + .31X_3 - (.00X_4) + .54X_5 - .07X_6 + 224.73$

3. Grade V, Male+female, urban+rural — $Y'_R = .19X_1 + 4.22X_2 + .24X_3 + .02X_4 - .12X_5 + .07X_6 + 266.23$

It may be pointed out here, that in those cases where the b-weight is very small, with no significant figure at the second place of decimal, the product of the b-coefficient and the respective variable has been shown in parenthesis, indicating that this particular variable's contribution in determining the estimated Y score is so negligible that their variable may be as well eliminated from the regression equation.

A close examination of the 81 multivariate regression equation shows that social maturity, variable number 4, is a poor predictor, and in several equations its contribution in determining the predicted criterion score is negligible. 'Sociometric status index' is also a poor predictor, but never as poor as 'social maturity'. Moral relativism comes next, and intelligence quotient is still a better predictor. Of course both LinSES and LinSEC are good predictors. From a practical point of view, it will be best to use only three predictors – LinSES, LinSEC, and IQ. If a fourth predictor is to be used, then moral relativism

may be used. It will be wasteful to administer the sociometric test to the entire class just to know the sociometric status index of the few subjects for which prediction in one or more criterion scores is being sought. Likewise, social maturity is of very little value.

Until cross validation has been done on a fresh sample, it would not do to make recommendation which set of multivariate regression equation should be used. In fact, the magnitude of error in prediction by using different equations, for predicting the same criterion, may be determined to find out which equation is best, at what age-grade level. The equation that leads to the least error should naturally be chosen.

Multivariate prediction is one of the most powerful of arms in the statistician's armoury; it makes use of all information that is available for predicting scores in a criterion in such a way that prediction by any other method will lead to even greater error, as a deviation from the actual. In forming the multivariate regression equation, error variance is also capitalized upon. But, by cross validation, this aspect can be improved also. The above multivariate regression analysis has shown that for the UNI data of the Varanasi Centre, this approach for predicting performance is a justifiable and viable method.

Chapter 19

Critical Appraisal of the Findings: Some Questions and A Few Suggestions

It is customary in studies of this type, specially in the fields of psychology and education, to have a separate discussion of the results. Along with the presentation of the findings, from Chapter 10 onwards, a certain amount of discussion about the implication of the findings of the study has also been included - mainly for two reasons. One was the appropriateness of the occasion requiring immediate comment upon some interesting findings. Delaying of such comments for a later chapter would have entailed loss of immediate perspective, and relevances of the context, besides entailing curtailment in the economy of presentation of the arguments themselves. Secondly, in a report as bulky as this, defining the discussions of the implications of the findings would be a clumsy and inefficient way of doing the right thing. So presentation of the main findings has been interspersed with some discussions of their implication also, on many occasions.

However, having come thus far, the need for an overall appraisal of the findings, in which a more total view could be taken, still remains. This will be attempted in this chapter, only briefly, because, going into any detail may result in repetition and duplication of what has already been written earlier, and this has to be avoided.

Impact of Family Background and Quality of Schooling

If we recall some of the specific hypotheses that have been formulated in Chapter 4, it will be seen that most of them have been sustained, of course, within the limits of sampling fluctuations that were inevitable in the study design itself.

In the scheme of analysis that we have followed in this study, what is called 'between group' differences between schools, have not been taken into consideration in an exhaustive and extensive fashion. Two types of differences between schools have been taken into consideration quite systematically; these are location of the school in urban or rural areas, and excellence of school in terms of teacher qualification, teacher-pupil ratio, and school facilities and equipment. We have found out two interesting trends: urban school children have a slight but persistent edge over their counter rural school counterparts, in achievement in school subjects, and even in moraic test performance. Such a systematic difference is seen more as a trend, even in the measures of psychological

variables which are traditionally considered to be influenced but only slightly by home or the school, like intellectual functioning level, social development, moral development and social acceptance. What has been called LinSEC in this study, which is a composite measure for excellence of schooling, has been found to be related to performance in school subjects, and also with the qualitative level of the mosaic designs created by the same group of children.

Certain relations between such factors as size of the school, or its type of management with the performance in school subjects have been noted, but here whatever effect may actually be there have been found to be somewhat marked by the two more important contributory factors, viz. urban-rural dichotomy of location, and quality of schooling (as measured by the composite LinSEC scale). But, what needs to be realised here is the fact, that even after schools have been categorized in terms of rural-urban location, and trichotomized in terms of good-average-poor in terms of quality of schooling (measured by the composite LinSEC scale), certain variations still remain among the schools themselves, which the present statistical analysis has not taken into account, since children of all schools belonging to particular combination of these factors alone (location and LinSEC categories) have been considered as a group, and children in those schools have been lumped together. A finer, more precise, analysis should first establish that there does not exist any significant "between group" main effect. Within each cell consisting of schools belonging to each of the combination of location (rural or urban) and LinSEC category (good, average or poor), is negligible. If this main effect is found to be large, this might have been responsible for some of the erratic jumps in group means in certain variables.

Having disposed off this point - about inherent variability within the set of schools sampled in the study, the overwhelming fact remains, that both location of schools, and their quality do have considerable impact upon the children's school performance as well as their psychological functioning, though to a lesser extent. The importance of caution in interpreting such obvious - too obvious - findings need not be overemphasized. For example, how much of the superiority of the urban school children over the rural school children is due to cultural factors related to location, and how much due to the fact that in the rural group of sixteen schools, there were many more poor and average schools, than in the

urban sample of 15 schools? The many instances of a significant location x school excellence interaction in the analysis of variance findings, presented in Chapter 17, may be recalled: a loaded result, following from the inevitability of the objective quality of the situation - rural schools, by and large, are traditionally no match to urban schools, despite certain advantages enjoyed by them in terms of space, surrounding etc. There is nothing like a 'good' school in the rural area, which can be a match to the 'good' school in the urban area. These are predicated by social-cultural-economic conditions of the society, and will find expression in the education imparted to children studying in them. The findings of the study have only confirmed a hard sociological reality known since long.

This brings us to the second important confirmation provided by this study - the most important single factor contributing to the educational and cognitive-perceptual functioning of the school going child is the level of the stimulation provided by his home and family. All these indicators of what is known as socio-economic status jointly account for the maximum amount of variance of the child's performance in school subjects like Hindi and mathematics, as well as a imaginative-organizational task like the mosaic test. This is amply borne out by the fact that the zero-order correlation of LinSES (which is equivalent to whatever is generally measured by any standard scale measuring socio-economic status) with most other variables, especially the achievement tests, various measures derived from the mosaic designs, as well as the five intervening variables covering some basic social-psychological-personality dimensions, are generally positive and of substantial size. Not only this, there is additional supportive evidences of the importance of the LinSES measure from the multiple regression analysis results also. Enough evidence has been adduced in Chapter 18, about the fact that LinSES is an infallibly good predictor for both the achievement tests, as well as the mosaic test ratings. This confirmation of the signal importance of LinSES - which is a composite of the seven different separate socio-economic-status indicators, viz. education of father and of mother, occupation of father and mother, income of the family, caste and religion, in predicting performance in two selected school subjects, and the mosaic test of imaginative production, only subsuming adequate sampling, satisfactory tools, and appropriate data analysis methods. The contribution of the qualitative level of schooling comes next to family background

factors, in general, is a finding of no less importance, from a practical point of view. It is clear that, given the socio-economic background factors as a constant quantity, performance of the children can be improved substantially by improving the level of schooling, all students will stand to gain by it. It is almost a trile observation that the general socio-economic conditions of the masses can be improved only by a many-pronged and gigantic national effort. But a fraction of effort spent on improving the quality of schools will result in overall increase in the level of performance of the students - in the more important school subjects.

At this stage, a few interesting points may be underlined. It has been shown in great detail in Chapter 16, that while each of the separate components of LinSES correlate appreciably and generally positively with the achievement test and mosaic design variables, the correlations for the rural groups tend to be lower than their urban counterparts; of course there are exceptions also. Again, the values of the zero-order correlations tend to dwindle in size, as we go from grade I through grade II to grade V. The decrease is not at all so evident in the correlation values of LinSEC with the same variables - from lower age-grades to higher age-grades, but the same dwindling is seen in changing from urban groups to rural groups. What is the explanation for this peculiar decrease in correlation between LinSES and LinSEC on one hand, and the achievement variables on the other? One thing is clear: the high correlations in lower age-grade groups, in the case of LinSEC variables, are not reduced in higher age-grade groups - showing that level of educational benefit derived by the children from the schooling, they are undergoing, is sustained in higher classes, while the influence of the home factors either taper off or may even decrease with increasing maturity of the children. But the lowering of correlation values in rural groups compared to urban groups, both for family background factors and school facilities factors, is not easily explained. The only explanation that can be offered at a tentative level is this - the rural society **exercises a uniformizing** or equalizing or levelling influence, which may be absent in the urban culture. In fact, urban environment may act in an opposite fashion - by tending to emphasize competition and disparity - this results in increasing variability within the group, with concomitant rise in the correlation between pairs of variables. That urban groups, both male and female, show greater variability, is amply borne out by the values of standard deviations that have

been reported for urban and rural groups in Chapters 12 and 13. It will be seen that by and large, urban distribution of most variables have greater standard deviations compared to their rural counterparts. The upshot is simply thus: We are again coming up against sociological determinism: there is something in urban environmental conditions that tend to increase variability among the students; this influence is somewhat, but definitely, less in the rural environment. Or let us put it this way: rural environment does not produce so much of variability or individual differences, as urban environment tends to create. Why it is so, will be beyond the purview of the terms of reference of this study.

We have also noted that in general there is a tendency for inter-variable coefficients of all types of pairs, to be lower for females compared to those for males. This phenomenon again can be traced to a curtailment of variability among females compared to the males, where this curtailment is absent. There may be ingredients in our culture, which tend to foster greater competitiveness among male students compared to female students. This might be so in co-educational schools - where girls may tend to be more submissive than the boys, but what about purely girls schools - where, within the school competitiveness may be fostered with equal vigor as in comparable boys schools. As pointed earlier, the influence of socio-environmental cultural factors in increasing intra-group variability among urban children is related more to social-economic and family factors, than to quality of schooling. In fact, in rural areas, quality of schooling can compensate for the disadvantage of cultural impoverishments that the rural environment may entail.

Differential Development and Performance : Psychological and Educational Functions

Before we make an attempt at overall assessment of the differential developmental pattern - both in psychological functions and educational achievements, some comment may be in order on the adequacy or otherwise of the instruments used, and the measures devised therefrom.

The pressing need for a comprehensive yet concise, well-standardized instrument for assessing socio-economic status still continues. We need an instrument which can be used both across rural and urban areas. Some sort of differential weighting of the components has to be evolved which

would permit treating all households, whether placed in urban or rural areas, as if belonging to the same continuum. The need for such a research instrument is very pressing. Perhaps a national level project should be undertaken to develop such instruments suitable for homogenous regions of the country. The instrument that has been used in the present study and the composite scale which has been derived from it, called LinSES, has been found to be very satisfactory. From the point of internal, structural properties of the components, it seems that the way the scale has been devised is quite justifiable. However, the empirical validity of a composite measure like LinSES has to be ascertained on a scientific basis, in order that this scale is found acceptable for general and research use.

Similarly, the value of a composite scale like the LinSEC, for measuring the level of a school's educational functioning, has been established. However, there is no denying that the LinSES measure, the way it has been devised, requires to be improved considerably. First, it is based on only three components, viz. teacher-pupil ratio, teacher qualification, and school facilities and equipment. Whether some additional components can be included in the composite scale has to be explored. Secondly, the relative weights to be given to each of components of the composite school, have to be determined carefully. Suffice it to say, that such a scale for measuring excellence of the quality of schools can be built by using the components that have been used in the present study. Lastly, the external validity of the scale has also to be established in a scientific manner.

The Porteus Maze Test has been found to be quite a satisfactory instrument for measuring mental age and intelligence quotient. The fact of its being a non-verbal test has added to its merit. The distribution of IQ scores among different groups of children varying within narrow bands of age-grade, is quite in conformity with expectations. The slight but consistent rise in the mean IQ values in the higher grade, is perhaps an outcome jointly determined by two factors. One may be related to the characteristics of the instrument itself - very small children being at a relatively greater psycho-motor disadvantage compared to somewhat older children. The other is the factor of selection: the possibility that a fraction of the really dull children are eliminated from attendance in schools, by the time they reach grade V, cannot be ruled out, more so in rural areas, and among children

coming from lower social-economic levels, even in the city.

The instrument for measuring moral development has also proved to be quite satisfactory, as well as interesting. It seems to have a measure of external validity, vouched by the systematic rise in average 'moral relativism' score, as we go from grade I to grade V. (See Table 12-16 for a summary of the group averages). The average for grade I is 11.40, for grade II is 12.19, and for grade V is 14.74. Despite a slight but systematic difference between urban and rural averages - with the advantage going to the urbans, this systematic difference related to development and maturity, is consistent in both urban and rural groups, separately also. Thus the averages for the three age-grades of the urban schools are 12.19, 12.25, and 15.15 respectively, compared to 10.52, 12.13 and 14.22 for rural schools.

Why should the rural children as a group be somewhat deficient compared to the urban group - even if the difference is so slight? One reason may be related to comparative lack of exposure of the rural children to experiences - theoretical or actual - of moral and immoral, ethical or unethical conduct, in their environment. The urban children's environment, in this matter, might be more varied, and 'enriched'. But this view is speculative in nature. A view is current which holds that the frequency of petty crimes, deviations, immoral and unethical acts, is higher in urban areas compared to the rural areas. The urban children being exposed to them, and their developing some discriminatory responses, is a logically tenable assumption. Alternatively, the instrument may have been so framed as to contain items with differential bias - some items favouring discriminatory response by urban children, and some by rural children, the other groups failing to respond discriminatorily. A differential item analysis among rural and urban groups will be quite in order to settle this issue.

Social acceptance and popularity, as indexed by the weighted sociometric status index used in this study has also proved to be an interesting variable, but somewhat erratic in its behaviour from one group to another. But a systematic functional relationship between sociometric status index and maturity cannot be disputed as the evidence provided by this study. In Table 12-20, the group averages of this measure have been provided. The jump of the average value of sociometric status index, from 2.73 in grade I to 4.55 in grade V,

among urban schools, and from 2.18 in grade I to 4.07 in grade V, among rural schools, have to be noted. For the combined urban and rural schools, the jump is from 2.47 in grade I to 4.29 in grade V. Despite popularity or social acceptance being related to development and maturity, its relationship with achievement in educational subjects and the mosaic test, is neither very strong, nor very systematic. The conclusion that appears to be reasonable is this: social acceptance, as a psychological process is not able to influence the cognitive and motor developments that are brought into play in the tests of achievement of school subjects or a performance type of projective test as the mosaic. At best it may create a psychological climate favourable for the motor functioning of the processes related to learning and performance subsumed in this study. Hence, the magnitude of shared variance is expected to be small, though definite, between social acceptance and school achievement, and proficiency in imaginative tasks.

The last instrument in this category, the one for measuring social maturity, has proved to be somewhat of a disappointment. Perusal of figures given in Tables 12-9, 12-10, 12-11 will at once show that the systematic variation that is expected in the average values of 'social maturity' as one goes from grade I through grade II and grade V, is largely absent. The differences between rural and urban groups, and between male and female groups are also erratic and unsystematic, and small in magnitude. Correlations of this variable with all other variables have tended to be low, positive or negative, and varying unsystematically from group to group. For whatever reason it may be, this instrument has not behaved well, so far as this study is concerned. One reason for this may be speculated upon. Most of the instruments for measuring achievement, or performance, in the school subjects and other tests were required to be responded to by the subjects themselves - be they very young kids of 5½ years in grade I or fairly mature boys and girls upto 11 years age in grade V. But this instrument - for measuring social maturity - had to be filled up by knowledgeable teachers who were acquainted with the students to be assessed. The possibility of error caused by lack of knowledge, carelessness, and response set, cannot be ruled out. This would result in lack of variance in the items checked against each subject. It appears that this factor can be held at best responsible in part for the lack of discriminatory power of

this instrument. How this instrument can be made more precise, has to be tackled at the psychometric level. The adequacy of the instruments for measuring achievement has already been commented upon and need not be repeated here. However, it may be meet to point out, that in the mathematics tests particularly, and the Hindi tests in general, the difficulty level has been fixed in such a way, that the overall levels of performance by most groups have tended to be low in an absolute sense - if the theoretically maximum score for each test is taken into consideration. There has been considerable crowding of the scores at the lower ends - sometimes there has been absence of even a tail, long or short - towards the positive ends of the distribution.

Home and School Interaction

A complete understanding of the complexity of the processes determining the level of achievement of school children entails knowledge about the correspondence or its lack, between two sets of shaping factors, one emanating from the home-family-neighbourhood cluster, and the other from the school-teacher-peer group cluster. Some of the factors operate in the same direction, some are opposed to each other, and some are independent of each other. It will be seen from findings reported in earlier chapters, and also in Chapter 18, that LinSES and LinSEC are generally appreciably correlated one with the other. In the scheme of multivariate predictions, usually the two best variables for predicting the criterion variable, happens to be LinSES, and LinSEC. Statistically, this would have been ideal, for the purpose of accurate prediction of the criterion, but for one snag - presence of an appreciable correlation between LinSES and LinSEC themselves. What does it mean, in non-statistical language? It means simply this: children from poorer or more disadvantaged homes have tended to flick in the academically poorer schools, and vice versa, that is, children from better homes have tended to crowd in the academically more advantaged schools. Add to this, the fact, that, in rural areas there are relatively more poorer schools, than in urban areas. Joint working of these two factors would tend to accentuate the urban-rural differential, and raise the correlation between LinSES and LinSEC on one hand, and the other psychological and academic variables on the other.

Let us go back to Table 10-4. We note that among the urban schools, there is one school with a LinSEC score of

4, 5 schools with LinSEC score of 5, 3, with a LinSEC score of 6, 3 with LinSEC score of 7, 2 with LinSEC score of 8, and 1 with LinSEC score of 9. What about rural schools? There are 2 schools with LinSEC score of 3, 4 with LinSEC score of 4, 7 with LinSEC score of 5, 2 with LinSEC score of 6, and 1 with LinSEC score of 7. <u>There is no school in the rural area with LinSEC score of 8, or 9</u>. Again, let us turn to Table 11-31. We note that at least 20% of the students of the urban sample have LinSES score from 29 to 42 - and what is far more significant - it is these 20% of the students belonging to the upper rungs of the socio-economic ladder, who are enrolled in these better type of schools. On the other hand, in the rural schools, none of the students had LinSES scores exceeding 28. In fact, 45.4% of the rural school students had LinSES scores ranging between 2 to 19 only. The differential weighting that inevitably occurs in favor of about 20% of the urban sample of children cannot thus be denied. There were actually 3 schools with LinSEC scores of 8 and 9, in which were enrolled exactly 11.6% of the total sample - all of whom belonged to the urban category. Then there were 3 schools in the urban set, and a single school in the rural set, in which were enrolled 12.9% of the entire sample. Thus about 1/4 of this 12.9%, that is about 3¼% of rural students who had similar type of educational advantage comparable to the advantaged section of the urban students. It turns out that approximately 22% of the urban children as compared to about 3¼% of the rural children had the advantage of good "schooling". And we have seen that enrolment in the better types of schools tends to be monopolised by children from the more affluent section of the urban community. Thus, some of the rural-urban differential is seen to be compounded by deepseated social-economic factors, which are not directly related to the educational process or to psychological maturational processes. We then may conclude that one of the major findings of this study is the confirmation of the mechanism of the socio-economic determinism of the differences that tend to become apparent among school children, even if they start with equivalent genetic equipment.

<u>Contributory Role of Intervening Variables</u>

The multivariate regression analysis of data for predicting scores in 3 variables, viz. achievement in Hindi, achievement in mathematics, and Rating of the subjective attributes of mosaic design has provided two findings of considerable improvement. One is that, knowledge of the socio-

economic status level, and of the rating of the school in terms of its academic excellence, will make for fairly accurate prediction of scores in criterion variables, that similar groups of children are likely to make. Comparatively higher values of R in the smaller, homogenous groups should be taken with the proverbial pinch of statistical salt - because, as is well known the computation of the R values capitalizes upon the error variance among predictors, which are likely to shrink during replications. The R values for larger, heterogenous groups are comparatively smaller, but have the advantage of limited shrinkage during replication on similar groups. In the big large groups of the same age-grade, the R value are around .500, which means about 25% of the criterion variance can be predicted from the judicious use of the knowledge of the group's scores obtained in the predictor variables.

The next important point is that if additional predictor variables are used, such as intelligence, social mobility etc. etc., there is expected to be further gain in the accuracy of prediction of the criterion score. The extent of this gain varies, depending upon the type of group used, and the criterion which is being predicted. The gain will be much greater for Hindi and mathematics, compared to the rating of the mosaic design. The crucial question is this. What is the cost or investment required for obtaining best results from administration of 1, 2, 3 or 4 predictor variables? And how that cost compare with the social gain, accrued from the increase of accuracy of accounting for say, an additional 10% of the predicted variance of the criterion? A ready made answer cannot be given at once, but some indication can be provided, all the same.

We have seen that 'social maturity' has proved of little worth for predicting the criterion - very clearly demonstrated by its zero weights in a number of regression equations. So we are well advised to drop it from our repertoire of predictor tests. The sociometric test is also of limited value, Another point which disfavors its use is the fact that this test requires its administration upon the entire class, and naturally scoring of the obtained test results becomes a cumbersome process. The concomitant gain from using the result of this test can hardly offset the investment in time and trouble for obtaining the test results.

So, we are left with 2 additional predictor variables - intelligence test, and moral development. Actual

administration of these two tests, even though the first one is individually administered, does not require much time. Their scoring is also simple and not time consuming. So the four predictor variables that are advisable to be used are LinSES, LinSEC, IQ from the Porteus maze test, and the Moral Relativism scale. Depending upon the group upon which it is used, we can expect an accuracy of around 30-40% if not more of accounted variance of the criterion variable. The great advantage of the use of the multiple regression equation lies in the fact that the predictor tests need be used only on those selected subjects whose future performance we are interested to predict. This is one of the advantages of the development of multiple regression equation.

We have already commented upon the fact that use of additional predictor variables, over and above the two basic predictor variables, viz. LinSES and LinSEC, would always result in gain in accuracy of prediction of the criterion variable scores. The scientific implication of this finding is clear - the additional gain in accounted variance is traceable to the operation of the intervening variables - intelligence, moral functioning etc. The conclusion is inescapable that for obtaining additional insight into the psycho-educational processes of development, it is necessary to invoke knowledge of the working of the psychological and sociological intervening variables. To leave them out, will amount to ignoring some important and valuable knowledge which is not scientifically tenable. Therefore, the throwing in of the study of the 4 additional variables as belonging to the intervening category, in the design of the present investigation, seems to have been fully justified.

Some Questions and A Few Suggestions

In a massive report of study such as this, the number of questions that are raised, for which no obvious answers are evident, is quite large. For some of these questions, most probably the answers are present, concealed in varying degrees of obscurity and uncertainty, due to complicated nature of the inter-relationships among variables, and fluctuating trends in group measures. To tease out answers all such questions will entail speculation, so it is better avoided. But there are some questions belonging to a different genre. These are the questions that have such scientific implication, that answers to them should better be sought through further research and additional data analysis.

Let us indicate some of these questions, in a highly selective manner.

1. The value of the various multiple regression equations developed in this study can be established when these are cross-validated on a new sample. During that time, or separately, this question can be asked - how well do these multiple regression equations predict actual school performance in Hindi and mathematics? The actual marks obtained by the subjects included in the sample in the public examination held at the end of grade V, and of the regular school examinations obtained at the last terminal, annual examination, can be utilized for this purpose. The scores in Hindi and mathematics predicted by using the regression equations, can be correlated with the marks in the same subjects referred to above. This is not the same thing as cross-validation proper - but is an indirect method of cross-validation all right.

2. Another important question is related to the determination of the intervening or mediating character of the four psychological variables included in this study. Do these variables function as truly intervening variables, or they also function as independent variables? The results of the 2-predictor and 6-predictor multiple regressions seem to point to the tenability of the assumption that these psychological variables act as intervening variable in fact, but the evidence is indirect and is a function of the way that the regression equations have been set up. Further research, which mostly involve reanalysis of the obtained data only, can be undertaken to pinpoint this question. Such models of statistical analysis as 'critical path analysis' may perhaps be invoked for finding evidence about the true nature of the psychological variables.

3. A related question can be formulated thus: how far, or to what extent, do the family background factors and school facilities factors jointly or separately influence in determining the level of intelligence, social maturity, moral development, and social acceptance? Appropriate regression equations can be developed, where each one of the four psychological variables becomes the criterion, to be predicted by the linear combination of the remaining variables. Some additional sophistication may be introduced in this model by including the school subjects also as additional predictors. We are resorting to questioning in a reverse

fashion: "How well does the more successful student in the academic sense perform in an intelligence test? What level has he attained in social maturity? How popular is he? How well is his sense of morality developed?" Undoubtedly, there are many interesting educational questions - when education means development of the total personality, over and above proficiency in school subjects.

4. Due to limitations on resource and research effort that can be invested, two basic school subjects, viz. social studies and general science had been excluded from the purview of the present study. A future study may like to extend it to include study of performance in these variables also. Its academic utility will be unquestioned.

5. A natural and logical extension of the present study will be in terms of age coverage of the students. A study can be thought of covering the crucial age of 11 to 16 years and grades of VI to X; it can be divided into two age-grade sectors also.

6. Such studies as this always deal with precise, objective tests of the criterion variables, which have been reasonably standardized for one region at least. Whether a criterion variable test, standardized on one regional sample, is equally good for another region, is still a researchable subject. It is clear that, in a country as vast and as culturally and linguistically diverse as India, inter-regional norms can be scientifically and operationally valid. Research effort towards that direction is well worth directing.

7. Passing or failing in public examinations or school examinations is not made the criterion variable to be predicted, in studies of this type, because of their very obvious defects and limitations. Yet, life being as it is, such examination results are very much there, and are likely to be with us, for some more time. Future research effort may be invested towards predicting such "noisy" criterion variable scores - examination results of great band with, containing a lot of error. Prediction of such "wide band", "noisy", criterion variables will pose additional challenges before the researcher, but the pragmatic realities of the educational program of the country demand that this challenge should be met, by trying to evolve still more sophisticated designs of statistical analysis.

We now have reached that stage, when we can say, that we have come to the end of our efforts, which were commenced more than $4\frac{1}{2}$ years ago. Knowledge grows out of accumulation of efforts by many, to which this report is meant, hopefully, to be just one humble addition. We only hope that the stream of more and comprehensive and sophisticated research will grow in volume with the passage of time.

* * * * *

Chapter 20

Highlights of the Present Study

Section I : About the Study

A Report as massive and detailed as the present one, in order to be optimally useful to the reader, should provide a quick overview of its highlights. This is presented here in the form of a summary which will be highly selected in that here only the relatively more important aspects and findings of the study will be described.

1. Introduction - Genesis of the study

About ten years back the NCERT had undertaken a nation-wide study entitled "Developmental Norms of Children : 3½ to 5½ years." Several Departments of Education and Departments of Psychology of universities in a number of States collaborated in this investigation, the major purpose of which was to develop some sort of norms of development of children of India belonging to this age group. This study was in the tradition of the celebrated developmental studies carried out by Arnold Gessell in U.S.A. in the forties.

NCERT felt that it would be worthwhile to extend such a study of children of the age group 5½ years to 11 years. This is the age when children go to study in primary school classes. Such collaborating centres were approached and agreed to carry out the study in their respective States. The collaborating centres are: Department of Psychology of Kerala, Ranchi and Osmania Universities; Department of Applied Psychology of Bombay University; Department of Postgraduate Education of the Bangalore University; Department of Psychology and Education of the Gandhian Institute of Studies, Varanasi; and the Department of Educational Psychology and Psychological Foundations of Education of the NCERT. The latter would be the co-ordinating center. NCERT provided the finance for the entire study.

Shift In Emphasis - Aims of the Study

As a result of a series of discussions among the Honorary Project Directors entrusted to carry out this study, it was agreed that the major aim of it will not be so much as to evolve anything like national or provincial or local norms of development of school-going children of 5½ years to 11 years, as to investigate the impact of home and family background factors, and academic and extra-academic factors exercised by the school upon the psychological and educational development of the child. Therefore, the performance of

the children in two school subjects – regional language, and mathematics, occupied the focus of the investigation. It was decided to have a core set of variables common to all collaborating centres. This comprised (1) Family background factors of the child; (2) School facilities and equipment; (3) General intelligence of the child; (4) Performance of the child in standard tests of regional language and mathematics of the level that are usually taught in school grades corresponding to the age range of the children sampled.

Two other important decisions were: (1) Each collaborating centre was encouraged to study additional variables besides the core variables, which were deemed to throw light on the working of the developmental process, and which followed from the model, if any, adopted by that centre. (2) The study, for purposes of uniformity, and economizing on resources, would be confined to children of three distinct age-grade groups, viz. Grade I – $5\frac{1}{2}$ years to $6\frac{1}{2}$ years; Grade II – $6\frac{1}{2}$ years to $7\frac{1}{2}$ years; and Grade V – $9\frac{1}{2}$ to 11 years. Children of Grade III and IV and $7\frac{1}{2}$ to $9\frac{1}{2}$ years of age were to be excluded from the purview of the study.

The population from which the sample of children would be drawn was left to be decided by the centres. It was further decided that there should be a pilot study conducted by each centre on a sample of 50, and the final study should be conducted on a sample, not below 600 in size. Instruments evolved and standardized by different centres could be used by other centres, thereby ensuring sharing of varying areas of common ground by two or more centres together. Periodic meetings and consultation among Honorary Directors of projects of different centres helped in the emergence of certain amount of uniformity of approach and adherence to an agreed phasing of the conduct of the studies.

Basic Model of the Varanasi Centre Study

In the study designed at the Varanasi Centre, the variables were divided into three major classes, in accordance with a model of psychological-social-educational development of processes that are generally assumed to take place within the typical primary school going children in this part of the country. In the first category we have two sets of major independent variables. The first comprises family background factors, and the second comprises schooling factors. In the present model, these two clusters of independent factors – one originating from the home from which the

child comes and the other originating from the school where the child is studying, are assumed to be acting upon the second category of variables, called the 'intervening' variables. These, in turn, are supposed to mediate between the independent variables on one hand, and the 'dependent' or outcome variables on the other. In the present study four fundamental variables have been shown to be included among the 'intervening' variables: Intelligence, social maturity, moral development, and social acceptance. The present study investigates an interaction between the home and school influences and the cognitive and social maturational developmental processes to determine the level of performance of the child in various cognitive functions that are measured by the school subjects, like language and mathematics. These latter subjects are actually taught in the school in which the children are studying. Their level of performance is seen to be a joint function of two sets of influences - one emanating from his home and school, and another emanating from processes within the children - which are natural maturational and social developmental in nature.

The Varanasi Center opted for including a special test for measuring the level of development attained by children in perceptual-organisation-ability. The aim is to find out to what extent growth and development undergone by the child is reflected in the way he is able to organise material by reacting perceptually to their stimulus qualities, to fabricate an outcome conforming to certain functions of cognition, imagination, and aesthetic satisfaction. The tool used for measuring this function was the Indian Adaptation of the Lowenfeld Mosaic Test.

The child comes to the school with certain basic equipments and skills, some of which are functional, and some are potential. The variety of influences impinging upon him fall into three broad groups:

(1) Those originating from the natural processes of growth and maturity;

(2) Those related to his home and family environment;

(3) Those which emanate from the academic and social functioning of the school of which he is a student.

The general objective of the study is to find out the nature of the interaction between these three major

classes of influences in determining the locus of development of the child with regard to functioning of his intellectual-cognitive and social-emotional processes.

In the light of the above aim, the following Basic Model has been conceptualised for providing a framework for the present study.

Level I Independent variables	Genetic Equipment		
	Home & Family environmental factors	Ecological factors of Neighbourhood	Environmental-organizational-academic factors of school

Level II Intervening variables	Cognitive functioning	Social Maturity	Social Acceptance and skills	Emergent Moral values

Level III Dependent variables	Language skills	Mathematical skills	Perceptual-organizing skills

In the boxes of each of the three levels, variables have been placed on a selective basis: there are many variables which could have been included. Global coverage commensurate with economy of effort and limitation of resources determined the selection of the variables to be studied. Thus parent-child inter-actional variables have been excluded from the purview of the study. The basic model of the study shows that, apart from the processes which are vertically oriented, from the I through the II to the III level variables, we can also horizontally study the interaction within a set of variables at each of the three levels. Thus, considerable insight may accrue about horizontal, within level interactional processes, as well as vertical, between levels deterministics processes.

Sampling. The universe for this study consisted of school-going children of the entire district of Varanasi, who belonged to three age-ranges, viz. $5\frac{1}{2}$ to $6\frac{1}{2}$ years, $6\frac{1}{2}$ to $7\frac{1}{2}$ years and $9\frac{1}{2}$ years to 11 years, and were studying in Grades I, II and V, respectively. A combination of quota sampling and probability sampling was used to draw the sample from the universe, for this study.

In the first stage, 15 schools from the City Corporation area of Varanasi, and 16 schools from the rural area of the entire district of Varanasi were selected, by using representative proportionate random sampling technique, where the following factors were taken into consideration:

(1) Size of school
(2) Boys school and girls school
(3) Government, aided and private management.

From each of the schools so sampled, the subject sample was drawn from grades I, II and V, following one criterion: in grade I, selection of the subject was confined to only those students whose ages fell within the range of $5\frac{1}{2}$ to $6\frac{1}{2}$ years; in Grade II between $6\frac{1}{2}$ to $7\frac{1}{2}$ years, and in Grade V between $9\frac{1}{2}$ to 11 years. But actual selection was strictly on a random basis. In this way, about 20 to 25 students were selected from the 3 grades together from each of the 15 sample schools of the urban area and 16 sample schools of the rural area. The sample size at the beginning was 680; there was considerable sample attenuation during the investigation phased out over an entire school year, but a final subject sample of 301 urban school subjects and 302 rural subjects could be retained in tact for which all test data were available.

Instruments for this Study. The instruments used for this study were fashioned in order to obtain information along those variables that went to the formulation of the research design, as is made clear from the following list.

(1) Information about sex and age were obtained from school records;

(2) A special socio-economic-status schedule was used to elicit information about parents' education, occupation, income, religion and caste, and some additional items about the family's material, non-material and human resources.

(3) A special School Facilities inventory was used to

gather information about teacher qualification, teacher-pupil ratio and school equipment;

(4) A Moral Relativism scale, which was in three parts, was used for eliciting information about moral development of the subject, in terms of social reaction, moral problems, and offence evaluation.

(5) A sociometric test specially suited for small children was used for estimating popularity or social acceptance of the subject by his own peer group;

(6) A social maturity scale was used to find out the level attained by the subject in social functions;

(7) The Porteus Maze test was used for finding the mental age and intelligence quotient of the subjects;

(8) A specially prepared achievement test in Hindi was used for measuring proficiency in this subject;

(9) Likewise a specially prepared achievement test in Mathematics was used for measuring proficiency in mathematics;

(10) The Indian Adaptation of the Lowenfeld Mosaic Test was used for estimating the level of perceptual-organizing ability of the subjects.

It will be seen that with the exception of the school records, there are nine definite instruments that were used in this study, in which 2 were meant for tapping independent variables, 4 for intervening variables, and three dependent variables - not counting the subparts or sections in each of these 9 instruments.

Procedure. The administration of the tests was done in 4 phases - which had some overlap:-

(1) In the first round, which was started in late August, lasted upto end of October 1972, the following 5 tests were used: (i) school facilities schedule, (ii) SES schedule, (iii) Porteus maze tests, (iv) Indian Adaptation of the Lowenfeld Mosaic Test, and (v) Social Maturity scale.

(2) In the secound round, starting in January, 1973 and lasting for about 4-5 months, the remaining 4 tests were used - (i) Sociometric test, (ii) Moral Relativism test, (iii) Hindi Achievement test and (iv) Mathematics Achievement test.

(3) In the third round, before the closing of the school session in May, 1973, attempts were made to [illegible] absentees - that is those who had been present a[illegible]

the first round testing, but absent at the time of the second round.

(;) A fourth and last round had to be resorted to in July-August 1973, to catch those strugglers - who had missed one or more tasks - for one reason or another - either during the first round or second round. Only with the help of the third and fourth round visits to schools, the sample size could be raised to 301 from the urban schools and 302 from the rural schools.

Data Processing. The data so collected were properly scanned, and checked, and then tabulated on master sheets. These were then transferred to tables for punching on IBM cards, by using a system of compréhensive codes deve- loped for the same. The punched cards were carefully chec- ked and verified. These were next sent to the Computer Center of PEO at New Delhi for statistical analysis.

The statistical analysis was divided into six sec- tions:- (a) Descriptive statistics for various types of groups - for all variables belonging to the independent cate- gory; (b) Mean and S.D.'s of all the intervening and depen- dent variables; (c) Inter-relationship between the three categories of variables; (d) Significance of differences between different types of group means, for all types of variables; (e) Multivariate regression equation for predic- ting performance in Hindi, Mathematics and Mosaic Test.

More Information about the Tools used in the study

I. School Information and Facilities Inventory. The final Hindi version of this instrument, called "Prathamik Sanst- hanon men upalabdha Shikshan Samagri Tatha anya subidhaon ki suchi, was divided into the following sections:

(i) General information about the school, like location, name etc.

(ii) Check list of facilities and equipments available under

(a) Educational Equipments of the classroom

(b) Educational aids and equipments available to the teacher for use.

(c) Amenities and space facilities

(d) Facilities for extra-curricular activities.

(iii) Scale for obtaining an index for the school on the basis of overall level of teacher qualification.

(iv) Attendance figures in classes to find teacher-pupil

ratio. By using this instrument, it is possible to obtain precise information about the following variables about the school, used for this study:

Variable	Information categories used
1. School Management	Government and Local Bodies/Private, aided/Private, unaided.
2. Sex composition	Boys/Girls/co-educational
3. School size	Large/Medium/Small
4. Shift system	Single/Double
5. Medium of Instruction	Mother Tongue (Hindi)/English
6. Teacher Qualification	Poor/Average/Good
7. Teacher-Pupil Ratio	Poor/Average/Good
8. Equipment and Facilities	Poor/Average/Good

For much statistical analysis in this study, a composite scale, called Lin(ear) S(um of) E(ducational) C(ategory scores) LINSEC in short, was developed, by linearly combining the last three categorical rating scale scores. The LINSEC scale had a range of 3 to 9.

II. Personal and Family Background Schedule. This tool, which was specially developed at the Gandhian Institute of Studies, has two sections: general, qualitative information, and specific, socio-economic status related information. In this second part precise information is gathered about

(a) Father's education
(b) Mother's education
(c) Income of the family
(d) Father's occupation
(e) Mother's occupation
(f) Caste.

By giving numerical scores to the different categories of possible responses to each of the six items listed above, a composite scale, called Lin(ear) s(um of) s(ocio)-E(conomic) S(tatus) (score), LINSES in short, was developed, which had a range from 6 to 45. Each subject thus got a unique LINSES score, but his LINSEC score was shared by all subjects drawn from his school.

III. Scale for measuring social Maturity. This scale consisting of 65 items, covered the following areas:

(a) Self-direction, (b) Locomotion, (c) Communication, (d) Co-operation, (e) Self-confidence, (f) Friendship, (g) Stress tolerance, and (h) Leadership. Items corresponded to typical behaviours and actions of school children varying in age from 3 to 1? years, which could be scored by any teacher acquainted with the subject. The scale yields a <u>social maturity age</u> score for each subject.

IV. <u>Moral Relativism Scale.</u> The finalized Hindi version of this scale, called "<u>Naitik Vikas Parikshan</u>" has three sub-scales, as follows: (a) social reaction; (b) Moral problems, and (c) offence evaluation. The 'social reaction' subscale contains six items of the multiple-choice type, one of the answers being correct. The 'moral problems' sub-test has also six similar items. The 'offence evaluation' sub-scale contains 15 items, in the form of paired comparisons between 7 types of offences, and kinds of punishments. The S has to indicate which of a pair of offences is more serious, and next, which of a pair of punishments is appropriate for the more serious offence identified by the S. A total 'moral relativism' score is obtained by adding up the three sub-scale scores, which has a theoretical maximum of 27 points.

V. <u>Sociometric Test for measuring social acceptance.</u> A simple near-sociometric test was developed which required, each member of the entire class or section to give the names of his three best friends, in order of preference from within his own class or section. From the choices so given the numbers of first, second and third choices obtained by each of the subjects included in the sample were found out. Next, by giving weights of 3, 2 and 1 for first, second and third choices respectively, a weighted 'sociometric status index' score was calculated for each subject, which indicated how popular each subject is within his own peer group.

VI. <u>Porteus Maze Test for measuring mental age and I.Q.</u> This is a well known and standard non-verbal test for obtaining mental age and IQ of subjects varying in age from 3 years onwards. Corresponding to each age group, there is a maze, which increases in complexity with age. The 'basal age' is determined first, by finding at the age the corresponding maze to which is failed by the S. Additional trials are allowed, which permits S to obtain credit for passing a maze even while he has faired in a maze of an earlier age. This gives the subject's 'mental age', from which, his IQ can be obtained by driving it by his chronological age. For this study both 'mental age' and IQ's were computed for each subject.

VII. Achievement test for Hindi. Corresponding to each of the three grades, I, II and V, there were three separate achievement tests in Hindi, comprising following subscales:

Grade I. Word recognition - 30 items
Sentence comprehension - 17 items
Sentence - picture association - 12 items

Each of the items was of the multiple-choice type.

Grade II. Sentence-picture-association - same as in Grade I - 12 items.

Read and Do - 18 items
Sentence completion - 20 items.

As in Grade I, the items were of the multiple-choice type.

Grade V.
Synonyms - 40 items
Antonyms - 30 items
Reading comprehension - 6 passages.

Here too, all items were of the multiple-choice type. The theoretically maximum scores for the achievement tests in Hindi for the three grades are as follows:

Grade I - 95
Grade II - 38
Grade V -100

VIII. Achievement test in Mathematics. Like those for Hindi, each of the three grades had a separate test. The test for Grade I contained 40 items, mostly on simple arithmetical operations, and a few on recognition of geometrical figures, and matching of pictures of coins with articles of corresponding value.

The test for Grade II, contained 30 items, of involving arithmetical operations, save one item, which required recognition of coins of differing values.

The test for Grade V, had a few items on geometrical forms, and definitions, on calendar time and reading of time by clock. The remaining items involved arithmetical operations. Total number of items was so. All items were of the multiple-choice type, in all the three tests.

IX. Indian Adaptation of the Lowenfeld Mosaic Test. This test consisted in making some design chosen by the S by arranging plastic pieces, a large number of which were available in combinations of six colors and six shapes. Permanent replicas of the designs made by all Ss were obtained. Objective features of the mosaic design, like time taken,

total number of pieces used, number of sub-designs, and area covered by the design were all recorded. The qualitative feature of each design were rated by three sophisticated judges with the help of a 15-item rating three-point rating scale. The average of the ratings given by the three judges was obtained for each design.

Section II : The Sample

Characteristics of the School sample. Fifteen schools from the urban area, and sixteen schools from the rural area were so selected as to reflect the rural-urban base, sex composition, size, and type of management inherent in the universe of all primary schools of the district, numbering about 2000. The administrative characteristics of these 31 sample schools are summarized below:

(a) There were 11 government or local bodies managed, 1 Private aided, and three private, unaided primary schools from the urban area, compared to 15 government or local bodies managed, and one private unaided school from the rural areas.

(b) Among the 15 urban schools, 2 were purely boys schools, 4 were girls schools, and 9 were co-educational; among the 16 rural schools, there was no purely boys school, compared to 3 purely girls schools, and 13 coeducational schools.

(c) In terms of size, there were five each of small, medium and large schools among the urban schools, compared to 10 small, 4 medium and two large schools among the rural ones.

(d) There was only one English medium school among the entire 31 selected schools, which was in the urban area; the remaining 30 schools were Hindi medium.

(e) Eleven schools in the urban area had single shift compared to 4 which were double shift; all sixteen schools in the rural area were single shift. Close examination of the combination of the five administrative characteristics present in the 16 urban schools and 15 rural schools revealed that there were 13 distinct combinations among them, though theoretically it was possible to have no less than 108 different combinations. The most popular combination was "government/local body managed, coeducational, small sized, Hindi medium, single shift' school, 2 such schools among the urban sample, 8 among the rural sample. The next popular type was the 'government/local body managed, coeducational, medium sized, Hindi medium, single shift' school, with 2 such schools from the urban area, and one from the rural area. Further, there were 2 schools among the

urban area, which belonged to the type, 'government/local body managed, coeducational, large sized, Hindi medium, single shift' school. Thus 18 out of 31 selected schools belonged to the same type, varying only in size. Among each of the remaining 10 types, there were either two or one schools - more in the urban sample than in the rural, variability being introduced due to sex combination, size and management type. Certain variation was found among these 31 selected schools in terms of the level of academic-instructional excellence. In terms of the factor of 'teacher qualification', there were 4 'poor', 7 'average' and 4 'good' schools among the urban schools, compared to 3 'poor', 12 'average' and 1 'good' schools among the rural schools. In terms of the factor of 'teacher-pupil ratio', there were 9 'average' and 6 'good' schools among the urban schools, compared to 6 'poor', 10 'average' schools among the rural schools. In terms of 'facilities and equipment', there were 6 'poor' schools, 6 'average' schools, and 3 'good' schools among the urban sample, compared to 13 'poor', 1 'average' and 2 'poor' among the rural schools. If all the three factors are combined, there were 7 'poor' schools, (1 urban, 6 rural), compared to 21 'average schools' (11 urban, 10 rural), and 3 'good' school (all urban), among the 31 schools selected. Thus, among the urban schools, there was a slight but definite pre-ponderance of better schools, compared to the rural schools. If a score of 3 is given for a factor in the 'good' category, 2 for the same factor in the 'average' category and 1 for the same factor in the 'poor' category, and the three factor scores are combined, a total 'school excellence' category score is obtained, for each school, which varies from a minimum of 3 to a maximum of 9. The average 'school excellence' category score for the 15 urban schools is found to be 6.2, compared to 4.75 for the 16 rural schools.

It will be interesting to find out what proportions of the entire student sample were placed under what level of schooling excellence. The following table rizes these facts.

Quality of schools	School Excellence category Score	No. of schools	Per cent	No. of pupils	Per cent
Poor	3	2	6.45	38	6.3
"	4	5	16.13	87	14.4
Average	5	12	38.71	212	35.2
"	6	5	16.13	118	19.6
"	7	4	12.90	78	12.9
Good	8	2	6.45	51	8.5
"	9	1	3.33	19	[illegible]
Total		31	100.00	603	[illegible]

It will be noted, that 125 pupils may be considered to have been placed under 'poor' schools, compared to 70 pupils placed under 'good' schools. That leaves 408 pupils (67.7%) who had been placed in 'average' quality schools. That is roughly two thirds were in 'average' quality schools compared to about one-fifth being in 'poor' schools, and one-tenth in 'good' quality schools. Naturally, these factors can be expected to exercise differential impact on the academic achievement of the pupils placed in such schools.

<u>Characteristics of Respondent Sample of School Children</u>. Economic description of the entire sample of 301 urban school children and 302 rural school children, in terms of the two sets of variables, intervening and dependent, can be best achieved by making certain meaningful combinations among these variables.

<u>Sex distribution</u>. Among the 15 urban schools, there were two purely boys schools, 4 purely girls schools, and 9 coeducational - at least in principle, if not in practice -, schools; among the 16 rural schools, three were purely girls schools, and 13 were co-educational in practice. The number of boys and girls among these different types of schools have been shown below:

Type of School	Number	Location	Number of boys	No. of girls	Total	Percentage of girls
Purely Boys	2	Urban	49	0	49	0.00
" " girls	4	Urban	0	69	69	100.00
Coeducational	9	Urban	139	44	183	24.04
		Total	188	113	301	37.54
Purely Boys	0	Rural	0	0	0	0.00
" Girls	3	Rural	0	47	47	100.00
Coeducational	13	Rural	210	45	255	17.65
		Total	210	92	302	30.46
	Grand	Total	398	205	603	34.00

It will be seen, that slightly more than one-third of the entire sample consisted of girls. About thirty nine per cent of these girls in the urban area, and about forty-four per cent in the rural area, were studying in coeducational or predominantly boys school.

There was also a consistent decrease in the proportion of girls from grade I (37.74%) through grade II (34.57%)

to grade V (31.28%).

Family Background of the respondent sample. For describing the family background of the respondent children, seven different variables have been used: father's education, mother's education, father's occupation, mother's occupation, income, religion, and caste. The sample is described according to each of these seven characteristics.

Father's education. About 1/3rd of the parents of all children sampled wer illiterate. In the urban sample, another 28% had parents with education upto 'middle school pass level' as compared to 51% in the rural sample. Again, in the urban sample, 40% had parents with education of 'high school pass' level and above, compared to only 18% in the rural sample. Thus, it is clear that, father's education level-wise, the urban sample was definitely more advantaged compared to their rural counterpart.

Mother's education. The picture is a little more extreme, with regard to the distribution of the level of mother's education of children from urban and rural schools. Sixty nine per cent of children of the urban schools, compared to 88% of the same in rural schools had illiterate mothers. Again, 19% of the urban children, compared to only 11% of the rural children, had mothers with education upto 'middle school' pass' level. This leaves only 1% of the rural children having mothers with education of 'high school pass' level and beyond, compared to 8% of the urban children having education of the same level. Thus in terms of mother's education, as successive higher levels are reached, the respective proportion of the rural sample, gets more and more, and systematically, behind the urban sample.

Father's occupation. The distribution of the different categories used for describing the occupation of the fathers of the children shows some interesting trend. There were about 22% unskilled fathers in the urban sample, compared to 13½% in the rural sample. But in the next three higher classes of occupation, the proportion for the rural parents was higher than that for the urban parents: 56% urban compared to 81% rural. That leaves only about 5% of the rural parents compared to 22% of the urban parents, occupied the next four higher categories of occupation.

Mother's occupation. There was little variability in this aspect of the sample: eighty-eight per cent of the urban sample mothers, and ninety per cent of the rural sample mothers, belonged to the 'unemployed' category. Next, 6.6% of the urban sample mothers, and 8.3 per cent of the rural sample mothers, had occupation described as 'unskilled manual work and labour'. This leaves 5% of the urban sample mothers and only 1% of the rural sample mothers having any occupation, of higher levels.

Income. Despite the uncertainty inherent in reported figures of monthly income, this had been recorded, and its distribution among the urban and rural samples for this study shows some very interesting trend. For example, the portion of what may be called the real 'poor', with monthly income less than Rs.200, for the urban sample families is 21½%, compared to about 11% for the rural sample families. Likewise, the proportion of what may be called the 'middle' level of income, is 61% in the urban sample families compared to 80% of the rural sample parents. It is only when we come to incomes ranging from Rs.700 and above per month that the proportion among the urban parents (18%) becomes greater than that (8%) among the rural parents.

Religion. Both urban and rural samples were overwhelmingly Hindu in religious composition - 84.4% urban and 95.7% rural children belonging to this religion. The proportion of Muslims was 13.3% in the urban sample, but dwindled down to only 4% in the rural sample. In the entire sample there are only 4 Christians, and 3 Jains (both in urban schools), and just one Sikh (in the rural school).

Caste. The distribution of caste among the urban and rural sample was very similar. There were 7.3% scheduled caste urban respondents compared to 8.6% scheduled caste rural children. Likewise compared to 46.2% of backward caste children among the urban sample, the proportion was 50.3% in the rural sample. Lastly, compared to about 32% upper caste children in the urban sample there were about 37% of the same in the rural sample.

The sample in terms of a composite socio-economic status scale.

In the same way that the composite scale 'LinSEC' was developed for obtaining an overall index of school excellence, the same procedure was adopted for obtaining a composite socio-status-index, called 'LinSES', which is an abbreviation

of form (Lin)ear sum of (s)ocio-(e)conomic (s)tatus variables scores was developed by giving differential weights to each of the different categories used under each of the seven variables. In this composite scale, religion and caste were combined and given weights according to the following scheme:

Hindu, scheduled castes are given a weight of 1
Scheduled tribes are given a weight of 2
Backward caste Hindus, Muslims, Christians, Sikhs, all are given a weight of 3
Upper caste Hindus and Jains are given a score of 4.

Categories under father's education and mother's education were given weights from 0 to 7; likewise father's occupation and mother's occupation categories were given weights ranging from 0 to 8. Income categories have been given weights ranging from 1 to 8. The composite LinSES scale ranged from a minimum possible score of 2 to a maximum possible score of 42. The LinSES scores thus are equivalent to scores obtained from similar scales measuring socio-economic status.

The distribution of the LinSES scores among respondents of different types of schools shows some interesting trends. Among the 70 children studying in 3 private, unaided schools, all located in urban area, there were 17 (24.3%) belonging to LinSES scores of 11-19; 39 (55.7%) belonging to LinSES scores of 20-28; 12 (17.1%) belonging to LinSES scores of 29-37; and only 2 (2.9%) belonging to the highest LinSES scores of 38-42. The situation in the remaining 12 aided urban schools was quite different: among the 231 students in these schools, 101 (43.7%) belonged to the lowest socio-economic status level with LinSES scores range of 2 to 10; another 112 (48.5%) belonged to the next higher level of LinSES scores of 11 to 19; and the remaining 18 (7.8%) belonged to the next higher level with LinSES scores of 20-28. There were none with LinSES scores higher than 28. The situation was very similar among the 302 students sampled from the 16 rural schools; with the following figures corresponding to the three SES levels - 102 (33.8%) with 2-10 LinSES scores; 186 (61.6%) with 11-19 LinSES scores; and 14 (4.6%) with 20-28 LinSES scores. Thus the relative affluence of the private, unaided schools sample is clearly borne out by the respective distribution of LinSES scores.

Elaborate statistical analysis clearly demonstrated that the 7 components of the family background variables were generally highly correlated among themselves - religion and

caste correlating highest. Further, there was modest correlation between family background components on one hand and the three categorical school variables, viz. Management type, sex composition and shift system, on the other. This provided additional justification for linearly combining the category scores for obtaining a composite score LinSES, reflecting an overall socio-economic status level of the subjects. The correlation between LinSES scores and LinSEC scores (for measuring level of school excellence) was uniformly of moderate to high value, in all groups of respondents, homogenous with respect to sex, location or grade, or when one or more of these factors are combined to obtain larger and more heterogenous groups.

With this description of the characteristics of the sample, in terms of their family background conditions, and the type of schooling they were undergoing, we can turn to consider how they have performed in the various tests administered to them.

Section III : Findings

Performance in Intervening Variables. The five intervening variables used in this study were the same for the entire sample of respondents, irrespective of sex, grade, and location of school. The mean performance in these five intervening variables, by different groups of subjects, formed on the basis of grade, sex and location of schools, provides interesting information about the systematic variation brought about by these factors, either singly or jointly. Of course, the significance of these systematic variation in mean performance is associated with group variability, but this need not be emphasized at this stage.

Mental Age. Mental age is one variable where systematic variation from grade I through grades II to V was expected to be most consistent. And this was found to be so: mean mental ages of urban subjects of grades I, II and V being 5.83, 6.94, and 10.67 years, and the same for rural subjects being 6.27, 7.35, and 10.42 years. The slight, but systematic superiority of the grade I and Grade II mean mental ages of the rural children over their counterparts of the urban school is of no importance - most probably it is due to a systematic difference in chronological age of the rural children above those of the urban children of the first two grades. In all grades, be it among urban or rural schools, the mean mental

ages of the male groups are found to be slightly higher than those of the female groups.

Intelligence Quotient. Despite the unreliability inherent in reported dates of birth of children in most part of our country, the index of intelligence quotient, derived by dividing obtained mental age by chronological age has one desirable feature - that converting the measure of intelligence into a measure with a comparable base line. That is why, in this study much of the later computations have utilized the IQ values rather the mental age, even though mental age is the more valid measure among the two.

It is found that in both grades I and II, the rural groups had higher mean IQ than the urban groups - the corresponding means being 94.94 for grade I rural and 89.09 for grade I urban groups; and 97.12 for grade II rural and 91.27 for urban groups. However, in grade V, the trend was reversed - mean IQ for the rural group is 102.96 compared to 104.18 for the urban group. Within each of the three grades, female mean IQ values are consistently lower than the corresponding male mean IQ values and this difference seems to be large enough significant in most comparisons. For example, in grade V, rural schools, the mean IQ for girls is only 92.55, compared to 106.86 for boys - a difference of 14.51 IQ points. Likewise, in grade rural schools, the mean IQ for boys is 99.00, and the same for girls is 86.86 - a difference of 12.14 IQ points. In grade this difference is 5.85 points. The differences in mean IQ values are relatively smaller between the two sexes in the urban schools, for all the three grades: 8.14 points in grade I, 4.13 points in grade I and 9.83 points in grade V. In any case, the systematic increase in mean IQ from 91.84 for all grade I students through 94.13 in grade II to 103.52 in grade V is an interesting and noteworthy finding of the study. By the time grade V is reached, a factor of selectivity may have become so effective as to raise the IQ of those who continue through schooling. It is also clear that, so far as the present sample is concerned, the average IQ value for the entire sample being 96.64 is perhaps indicative of only a certain extent of inadequacy of the instrument and to measure intelligence, specially at the very lower age levels. By the time the children reach V grade (9½ to 11 years in age), they appear to work at a fairly adequate level of intelligence so far as reflected by their performance in the Porteus Maze test reflects it.

Social Maturity. This is one measure, in which the scores obtained by the different groups of children show little differentiation, and whatever little variation is to be found from group to group, is somewhat erratic. First, the lowest mean social maturity score for any group is 10.11, for the female children of grade I, of urban schools. And the highest is 12.08, for the male children of grade V of the rural schools. Thus the range between the highest group mean and the lowest group mean is very small. The systematic increase in mean social maturity score from grade I through grade II to grade V is also very slight - 11.19 for grade I, 11.32 for grade II and 11.65 for grade V. However, there is one consistent difference is that between the urban school means and the rural school means: for each pair of groups, both for males and females, in each of the three grades, the rural schools group mean is slightly higher than the corresponding urban schools group mean. Thus, in grade I, the rural male group mean is 11.88 against 11.28 for the urban male group; for the rural female group the mean is 11.17 compared to 10.11 for the female urban group. In grade II, rural male group mean is 11.74 compared to 10.93 for urban male group. In grade V, the rural male group mean is 12.08 compared to 11.33 for urban male group; for the females, the rural mean is 10.86 compared to 11.95 for the urban mean. The last is an exception to the general trend. This slight superiority of rural group mean social maturity score on the same for urban groups, holds for all the three grades, when sex is ignored.

Moral Relativism. In this measure, the performance of different groups of children shows certain variations, some of which are consistent, and some are unsystematic. If the entire samples of Grades I, II and V are compared, however, a nice systematic trend is seen: the mean for grade I is 11.40; it rises to 12.19 in grade II; it rises still further to 14.74 in grade V. In grade I, the difference between males and females is very slight - 11.41 for **males** compared to 11.3 for females; but in grade II, the **females** have a higher mean than the males - 13.22 as against 11.65. But in grade V, the trend is reversed - 14.92 is the mean for males compared to 14.02 for females. This trend is replicated more or less faithfully in each of the smallest homogenous groups - with respect to sex and location of schools. The mean for rural children is 10.52 compared to 12.19 for urban children, in grade I; the corresponding means are 12.13 and 12.25 for grade II; and 14.22 and 15.15 for grade V.

Thus, it is clear, that the urban children as a group have higher mean 'moral relativism' scores than rural children, for all the three grades, whether sex is ignored or taken into consideration. The highest group mean is 15.42 for females of grade V of urban schools; the smallest is 10.30 for males of grade II of rural schools.

Sociometric Status Index. The sociometric status index reflects the extent of group acceptance, or popularity of each of the subjects chosen in this study among his own peer group. To the extent the subject chosen is representative of his age group, within his grade, he is expected to be average in popularity. This appears to have been the case in the present study. The mean sociometric status index is found to vary from 2.47 in grade I, through 2.74 in grade II to 4.29 in grade V. It seems that in the higher grades more choices are exercised, or expressed, than in lower classes. There is no systematic rural-urban difference - mean sociometric status index for grade I rural, group is 2.18 compared to 2.73 for grade I urban group. But in grade II, the rural group mean is 2.93 compared to 2.56 in the urban group; but this trend is again reversed in grade V -- where the rural group mean is 4.07 compared to 4.55 for the urban group mean. So, there is no basis for concluding that any rural-urban difference exists with regard to this phenomenon of social acceptance. The differences between the male and female group means are erratic within the same grades. In Grade I, average for the males is 2.70 in urban schools, compared to 2.77 for the females; in grade II also, the male average 2.35 is lower than that for females, which is 2.86. But in grade V, it is opposite: mean for the male is 4.82, compared to 4.00 for the females. In rural schools, somewhat but not exactly similar trends are seen: in grade I, the mean for males is 2.34 compared to a low mean of 1.89 for the females. In grade II, also, the mean for males is 4.18, higher than the mean for females, which is 3.80. But in grade V the mean for the females is 3.73; higher than 2.62, which is the mean for the males. Thus, distribution of sociometric status index scores is neither sex specific nor location specific, but it does show some trend towards rise from lower to upper grades.

Performance in Achievement Status

Achievement in Hindi -- Grade I. There were three sub-tests in Hindi, for grade I. It will be reported later that the scores in the three subtests were generally highly correlated, in each small subgroups homogenous with respect

to sex and location of schools, as well as larger groups, obtained by collapsing groups along sex or location of schools.

In subtest I, the mean for the rural males was higher, ([illegible]) than that for the urban males (12.85); but it was opposite for the females, rural mean being 13.06 compared to 16.64 for the urban mean. This superiority of urban girls over rural girls is seen in subtest II and III as well: there the corresponding means were 5.57 (rural) and 8.02 for subtest II, and 11.43 (rural) and 18.98 (urban), for sub-test III The result was that the mean for the total scores obtained by combining the three subtest scores for the rural females was only 29.77 compared to 43.64 for the urban females.

For the male students, this tendency for the urban boys to score higher than their rural counterparts was preserved only in grades II and V, but to a much less pronounced degree. In Grade II, the urban male mean was 5.47 compared to 5.11 for the rural males; in grade V likewise the urban male mean was 11.62, compared to 9.02 for the rural male means. For the whole test, the mean for rural male group is 28.38 compared to 29.38 for the urban male group.

Again in each grade, and within both types of schools, rural and urban the females have scored higher than their male counterparts, for all the three subtests, the sole exception being in the rural schools, where the mean for boys is slightly higher than that for females - 14.35 compared to 13.06. The over-all result is rather peculiar: in urban schools, the mean for the boys for the whole test is 29.94, which is far lower than 43.64, the mean for the girls. But in the urban schools, the difference between the boys and girls almost vanishes, in the whole test, the means being 28.38 for males and 29.77 for females. Even if rural and urban schools are combined, the superiority of the females over the males remains - the mean for the males being only 29.15 compared to 37.34 for the females.

Grade II. The trend seen in the mean values of the three subtests, and the total test, for different small homogenous groups, and larger heterogenous groups, of grade I, is repeated in grade II also, with only slight variations. Here too, there were three sub-tests. The rural students have performed at slightly lower level than their urban counterparts in the first and third subtests, but more pronouncedly in the II subtest. For this first subtest, the mean for the rural sample was 8.12, and that for the urban sample 8.95; for the third subtest, the means were 6.07

(rural) and 6.50 (urban). But in the II subtest, the rural mean was 18.90 compared to 24.25 for the urban sample. For the whole test, the mean for the rural sample is 32.66, compared to 39.69 for the urban sample. A closer look at the performance figures for the very small groups reveals two interesting features. First, in each of the three subtests, the girls as a group have faired better than the boys, which holds for both urban as well as rural groups, with just one exception - in subtest II, rural schools, where the mean for the boys, 19.45, exceeds the mean for the girls, 17.50. Among urban samples, the means are 8.07 (males) and 10.23 (females) for subtest I; 20.14 (males and 30.26 (females) for subtest II; and 5.93 (males) and 7.33 (females) for subtest III; 34.14 (males) and 47.79 (females) for the whole test. The corresponding values for the rural sample are: 7.95 (males) and 8.54 (females) for subtest I; 19.45 (males) and 17.50 (females) for subtest II; and 5.89 (males) and 6.50 (females) for subtest III; and 32.71 (males) and 32.54 (females) for the whole test. Again, if urban and rural groups are combined, in each of three subtests the females are found to have an edge over their male counterparts - this is very pronounced in subtest II. For the entire test, the mean for all the boys is 33.37, which is significantly lower than that for all the girls, which is 41.69. Thus, it is quite clear that, in grade II also, the girls have done significantly better than the boys in the Hindi achievement test.

<u>Grade V</u>. By the time grade V is reached, the superiority of the girls over boys completely vanishes, and the boys establish superiority over the girls instead, in all the three subtests. Not only that, the trends of group means for small homogenous groups is also completely consistent - in every comparison the males have better averages than the females, and the urban samples have better averages than the rural samples. In subtest I, the mean for urban male is 18.51 and the same for the rural male is 16.77, compared to 14.97 and 12.42, for the corresponding female groups. Likewise, in subtest II, the mean for the urban male is 10.97 and the same for the rural male is 9.93, compared to 9.66 and 6.87 for the corresponding female groups. In subtest III, the mean for the urban male is 13.25 and the same for the rural male is 11.34 compared to 12.75 and 10.00 for the corresponding female groups. Thus for the whole test, the mean for the urban male is [illegible].72 and the same for the rural male is 37.92, compared to 37.38 and 29.29 for the corresponding female groups. This trend holds up if urban and rural

samples are combined: for subtest I, the male group mean is 17.53 and the female group mean is 13.71; for subtest II, the male group mean is 10.38 and the female group mean is 8.29; for subtest III, the male group mean is 12.12, and the female group mean is 11.40. For the whole test, the male group mean is 40.43, and the female group mean is 33.40.

It is indeed an interesting finding, that while in grades I and II, the females have performed better than the males in the Hindi achievement test, not only in subtests but also in the whole test, in grade, the males have done better than the females.

Achievement in Mathematics. For each of the three grades, there was a separate test.

Grade I. The urban students have performed much better than their rural counterparts, which is true for both the sexes. The mean for boys in urban schools is 16.70 but it is 14.03 in rural schools. For girls, the mean is 19.40 for girls in urban school, but it is only 12.66 in rural schools. Thus, in urban schools, the girls appeared to have performed better than boys, but the reverse seems to be true in rural schools, but the differences are small.

Grade II. Here the mean for boys in the urban schools is 9.49, and 9.42 for boys in the rural schools. Again, the mean for girls in urban schools is 11.28, compared to 10.15 for girls in rural schools. Thus, in both urban and rural schools, girls appear to have performed better than the boys.

Grade V. Here the sex trend is completely reversed: the mean for boys in the urban schools is 9.85, and 9.07 in rural schools; but the mean for girls in urban schools is 8.75 compared to 6.74 for girls in rural schools.

If the urban and rural groups are combined, the mean for grade I males is 15.42 compared to 16.34 for females; likewise, the mean for grade II boys is 9.45 compared to 10.83 for girls; but in grade V, the mean for boys is 9.41, compared to 7.78 for girls.

Thus, it is clear that the edge that girls exhibit in their performance in both Hindi and Mathematics achievement tests in grades I and II is lost by the time grade V is reached, where the boys perform better than the girls in both Hindi and Mathematics. The factor of selectivity mentioned earlier may be operative here too.

Performance in Mosaic Test. The design that resulted from the administration of the Mosaic Test could be assessed in terms of its objective features as well as its subjective attributes. Among the various objective features of the test performance that were recorded, the following four have been included for detailed study: Time taken to complete the mosaic design, total number of mosaic pieces used to make the design, number of sub-designs in the completed design, and extent of area covered on the tray by the design. The performance by different groups of subjects in terms of these 4 objective variables are first summarized below.

Time taken. In the rural schools, the mean of 'time taken' to complete the design is 2.69 min. in grade V. In the urban school, the corresponding means are 4.36 min., 4.79 min., and 6.82 min. If urban and rural schools are combined, the means are 3.54 min. in grade I, 4.17 min. in grade II, and 5.82 min. in grade V. There is very little sex difference in this measure. It is clear that as children grow older, they tend to give more time for constructing the design.

Number of pieces used. The trend shown with 'time taken' is also present with 'number of pieces used' - which are, of course, correlated. The mean number of pieces used, among rural samples, is 8.23 in grade I, 8.70 in grade II, and 10.31 in grade V. Among urban samples, the mean number of pieces used is 8.81 in grade I, 10.76 in grade II, and 12.02 in grade V. The difference between the urban and rural group averages seems to be quite consistent. Still, if urban and rural groups are combined, the mean number of pieces used is 8.54 in grade I, 9.75 in grade II and 11.09 in grade V. Within the same grade, differences in the mean values for male and female groups are small, but show a peculiarity: in the urban samples, the means for the male groups are higher than the female groups - in all the three grades; exactly opposite is the case in the rural sample; here in each grade, the mean number of pieces used by the girls is higher than that by the boys.

Number of subdesigns. Here very little variation is found among the groups. The average for the entire 603 subjects is 1.15; the smallest mean value for any group is 1.02 (Urban, Female, Grade I) and the highest is 1.50 (Rural, Male, Grade II). However, despite this lack of variability in the use of subdesigns, there are two systematic trends:

the rural school average is always higher than the urban school average - in all the three grades; secondly, the average values for a number of subdesigns used by girls have tended to be slightly lower than those for the boys, the only exception being grade I, rural samples. If urban and rural groups are combined, there is no systematic change from grade I through grade V - the three means being 1.23 for grade I, 1.32 for grade II, and 1.29 for grade V.

Area covered by the design: The area covered by the design could be expressed either as a percentage of the total area of the tray, or in absolute figures in square centimetres. But since the area of the tray is a constant quantity, both the values would be equivalent.

Certain systematic trends were found in this measure also, as one went from one group to another. First, it was found that the rural groups as whole have constructed designs covering lesser area than the urban groups. The mean for the rural sample is 124.42 compared to 157.18 for the urban sample, in grade I; in grade II, the corresponding means are 128.15 (rural) and 185.85 (urban); in grade V, the corresponding means are 147.18 (rural) and 164.48 (urban). Again, while there is a systematic increase in the mean value from grade I through grade II to grade V among the rural groups, it is not so systematic among the urban sample, where the highest mean is found for grade II, followed by grade V, and then grade I. Another peculiarity is linked with the sex of the subjects. In the urban schools, the mean for the male subjects is invariably higher than that for the female subjects, in all the three grades. Exactly opposite trend is seen in the rural schools: here, in each grade, the female group mean is higher than the corresponding male group mean. But the difference is small in grades I and V, but quite large in grade II. This difference constructiveness in using space to construct the design is difficult to explain! urban children being more expansive than rural children, irrespective of sex and grade, but in the rural schools, girls being more expansive than the boys, while the opposite holds for urban school children.

Subjective Attributes of the Mosaic Designs. The subjective attributes of the designs were rated with the help of three sub-scales: P-scale - containing 6 items describing pattern qualities of the design; A-scale - also containing 6 items, dealing with aesthetic-artistic qualities of the design; and the M-scale, containing 3 miscellaneous items.

All the items were of the 3-point graphic rating type, with a minimum score of 1 and maximum of 3. Correlations run between the scores in the 3 sub-scales established without doubt they are invariably very highly correlated. Hence, scores obtained from these three scales were summed to get a full-scale score, which is the best, and most representative measure for describing the subjective attributes of the mosaic design, as an artistic-creative product. The theoretical minimum for the whole rating scale is 3 and the maximum is 45.

The means for the three grades, after combining samples of both sexes, and both locations, (rural and urban schools) together, are 28.24, 29.34 and 33.72, for grades I, II and V, respectively. In other words, it is clear that, with increasing age, the children have tended to produce mosaic designs of increasingly more aesthetically-satisfying attributes. Again, in each of the three grades, the urban samples had a slight but consistent edge over its rural counterpart. In grade I, the average for the rural children (boys and girls together), is 27.68 compared to 28.75 for urban children; in grade II, the corresponding means are 28.85 and 29.81; in grade V, the corresponding figures are 33.32 and 34.54. The difference in the mean ratings is slight, but definitely in favour of the urban children.

The differences between means of boys groups and girls groups were very small, and were not systematic. What is important is the fact that with growing maturity, there is a perceptible increase in the level of the artistic quality of the mosaic. This is no doubt a finding of some scientific value.

It is quite clear that performance in the mosaic test is such that it reflects the increasing psychological development of the child as it passes from grade I through grade II to grade V.

Correlation among different variables

A careful count of the number of variables that have been fully quantified and studied in detail is found to be 35 made up as follows:

Family background variables	– 8
School variables	– 9
Intervening variables	– 5
Achievement and performance variables	– 13

Among these 35 separate variables, some are derived from other variables, for example, LinSES is a weighted composite of seven variables constituting the family background variables; likewise LinSEC is a weighted composite of 3 school facilities variables; IQ is derived from mental age, and so on.

Appropriate measures of correlation or association have been obtained between these variables, depending upon the type of scale used for obtaining scores for each variable under study. Many of the theoretically possible correlations, which number 595, are neither relevant nor meaningful, and so need not concern us here. It will be best to consider the intercorrelations according to certain well-defined clusters, the order being determined by the inherent psychological meaningfulness of the nature of inter-relationships under consideration.

A. Inter-correlation among Intervening and Achievement Variables

The correlations can be based upon small homogenous groups, 12 in number, which are homogenous with respect to sex, location of school, and grade. These correlations, being based upon smaller size of the sample, will naturally be subjected to fluctuations, and theoretically would tend to be lower than in the universe, due to restriction of range in the pairs of variables being correlated. A more stable value of correlations is obtainable if groups are made larger by combining either across sex, or across location; the introduction of greater heterogeneity in the groups may also help in increasing the correlation values.

Still greater stabilization can be effected by combining both these factors together - of sex, and of location of schools. Let us have a look into nature of the correlations between different variables in which the samples consist of both boys and girls, and of both urban and local schools, within the same grade. The correlations can be described variable-wise.

(a) Mental age. This variable, as expected, correlates very highly with IQ, in all the three grades - .973, .975, and .981, in grades I, II and V, respectively. It has a correlation of .21[illegible] with 'social maturity' in grade I, but in grades II and V, the same correlations are .061 and .002, respectively.

With the next variability, 'moral relativism', it has a correlation of .130** in grade I, but only .014 in grade II and .130 in grade V. With sociometric index, mental age has a correlation of .054 in grade I, .042 in grade II and .147* in grade V. Thus, it is only in the higher grade that a substantial inter-relationship seems to grow up between 'mental age' and social acceptance or popularity.

(b) IQ: Its high correlation with 'mental age' in all the three grades have already been mentioned. Its correlation with the remaining three variables follow a pattern similar to that of 'mental age': it correlates .220** with 'moral relativism', in grade I, but only .080, and -.004 with the same variable in grades II and V respectively. Again its correlations with 'sociometric status index' are .104, .034 and 151* in grades I, II and V, respectively.

(c) Social Maturity: Its correlations with 'mental age' and IQ have already been mentioned above. Its correlations with 'moral relativism' are .069, 101 and - 160*, in grades I, II and V respectively. This result is rather against expectation: on theoretical grounds, we should expect a moderate positive correlation. Again its correlations with 'sociometric status index' are -.024, .184* and .061, in grades I, II and V respectively. This is also quite erratic.

(d) Moral relativism. Its correlations with 'sociometric status index' are .092, .045 and .125, in grades I, II and V respectively, none of which is significantly different from zero correlation.

(e) Sociometric Status Index. Its correlations with the other 4 variables have already been mentioned above. To recapitulate: it has only three correlations which reach significance level at .05 level - in grade II, with 'social maturity', and in grade V, with 'mental age' and 'IQ'. The last two correlations values make psychological sense.

So far as these 5 intervening variables are concerned, it is in order if still larger groups are formed by taking all the 3 grades together, and then obtain the inter-correlations. Due to increase in the range of scores in some of the variables correlations would then tend to increase. This expectation is fully corroborated. In the sample of all boys and girls of the three grades together, of only the urban schools, 'mental age' has correlated .858** with IQ, .150** with 'social maturity', .374** with 'moral relativism', and .208** with 'sociometric status index'. Likewise, in

the entire rural sample, at all grades, mental age correlates $.828^{**}$ with IQ, .048 with social maturity, $.271^{**}$ with moral relativism, and $.210^{**}$ with sociometric status index. With IQ, the correlation values are somewhat different: It correlates $.143^{**}$ with social maturity, $.295^{**}$ with moral relativism, and $.152^{**}$ with sociometric status index, in the entire urban sample. In the entire rural sample, IQ correlates .038 with 'social maturity', .039 with 'moral relativism', and $.136^{**}$ with 'sociometric status index'. Social maturity correlates $.120^{*}$ with sociometric status index in the entire urban sample, but all its correlations with the remaining variables are not significantly different from zero. Moral relativism, however, correlates $.170^{**}$ with sociometric index in the entire urban sample, and $.147^{*}$ in the entire rural sample.

If the two samples, urban and rural, are combined, the situation, in terms of the significance of the correlation coefficients, naturally improves still further. Now mental age correlates .845 with IQ, .119 with social maturity, .319 with moral relativism, and .207 with sociometric index. Likewise IQ correlates .111 with social maturity, .172 with moral relativism, and .143 with sociometric status index. Social maturity correlates .036 with sociometric status index, and moral relativism correlates .161 with sociometric status index. All these correlations are significant at .01 level, save the last but one, which is significant at .05 level. The only correlation which fails to reach significance is that between moral relativism and social maturity.

These values of correlations indicate the extent of the stable core of interrelationship between the intervening variables - which is always positive, and of moderate value. Intelligence enters in a considerable way in each of the remaining 3 variables however.

Intercorrelation between Achievement Test Variables

Irrespective of whether the sample is a small homogenous one, within same sex, grade and location, or it is larger, by combining across sex and/or location, the correlations between the achievement test variables are uniformly high. Each of the three subtests correlate among themselves appreciably, the coefficients being usually within the range of .700 to .950; correlations of each of the three subtests with the total are never less than .900, but are usually

higher - going to .970 to .930. This is because of an artifact - the total score also contains each of the subtest score, and therefore the part - whole correlation is pushed up. Again, achievement in mathematics always correlates appreciably with the subtests of Hindi achievement, and the total score also. These correlations range between .400 to .600, and in some small groups even to .700 - .750. To give some concrete examples: In the entire sample of grade I (male + female, rural + urban, N=204), Hindi achievement subtest I correlates .782 with subtest II, .752 with subtest III and .898 with the whole test, and .720 with mathematics achievement. Hindi achievement subtest II correlates .884 with subtest III, and .934 with subtest III, and .728 with mathematics achievement. The total Hindi achievement test correlates .780 with mathematics achievement test.

In grade II (male + female, urban + rural, N=188), likewise the Hindi achievement subtest I correlates .646 with Hindi subtest II, .613 with subtest III, .800 with Hindi total, and .589 with mathematics achievement test. Hindi subtest II correlates .550 with subtest III, .959 with total score, and .550 with mathematics achievement test. Hindi achievement test III correlates .70[illegible] with the entire test score, and .552 with mathematics achievement test. Total Hindi achievement test score correlates .626 with mathematics achievement test.

In grade V (male + female, urban + rural, N=211), Hindi subtest I correlates .764 with subtest II, .621 with subtest II, .914 with total score, and .452 with mathematics achievement test. Hindi subtest II correlates .635 with subtest III, and .893 with total test score, and .509 with mathematics achievement test score. Hindi subtest III correlates .842 with total test score, and .564 with mathematics achievement test score. Total test score in Hindi correlates .569 with mathematics achievement test score.

Since the sample size is fairly large, considerable reliance can be laid upon these correlation values, which indicate the extent of common variance shared by both mathematics and Hindi achievement tests.

The correlations between the intervening variables on one hand and the achievement tests on the other occupy an intermediate range of values. Thus, mental age, IQ and moral relativism have got correlations with the achievement tests in Hindi and mathematics whose value range usually between

.200 to .400, or even somewhat higher. But both social maturity and sociometric status score have correlations with the achievement test variables whose values are not generally significantly different from zero. In some cases as in grade V, they are negative (with social maturity). This is with regard to fairly large, heterogenous and stable samples, for each grade. In smaller, homogenous samples, there is considerable fluctuations in the correlation values – specially with these two intervening variables, viz. Social maturity and sociometric status score.

<u>Correlations among and with Mosaic Test Variables</u>

The intercorrelations among the 4 objective features of design, and the 4 subjective variables of the same, show quite random fluctuations, if small, homogenous groups within each grade are considered. Stabilization is achieved by making the size of the sample larger, by taking both boys and girls of both urban and rural schools together, within the same grade. Let us look at the correlations values among the mosaic test variables within such stable groups.

'Time taken' correlates .467 with 'number of pieces' in grade I, .639 in grade II and .564 in grade V. Its correlation with all the remaining variables are low, and generally negative, and usually significantly different from zero, with just one exception: its correlation with 'area covered' is .432 in grade I, .627 in grade II and .513 in grade V.

The next variable, 'total number of pieces' has very high correlation with 'area covered' – .859 in grade I, .857 in grade II and .877 in grade V. Again, its correlations with remaining variables are small, generally negative, and not significantly different from zero. 'Number of subdesigns' has uniformly low, negative correlations with remaining variables, the exception being with 'area covered' in grade V, where the value of the r is .187.

The three rating scales correlate very highly among each other in all the three grades, and of course the correlation of each individual scale score with the total scale score is also very high. Thus scale I correlates .820 with scale II in grade I, .811 in grade II and .780 in grade V. It correlates .699 with scale III in grade I, .593 in grade II, and .579 in grade V. Scale II correlates

.723 with scale III in grade I, .686 in grade II and .661 in grade V. The total scale score has correlations with the I, II and III subscales in that order as follows: .936, .951, and .827 in grade I; .921, .953 and .761 in grade II, and .910, .941 and .743 in grade V.

Thus it is clear that instead of taking the separate subscale scores for the subjective features of the mosaic designs, it is as well to take the total score, which will be more reliable as well as valid.

We can end this section by describing in brief the nature of the intercorrelations between the 5 intervening and 2 achievement test variables on one hand, and the mosaic test variables on the other. Here also, the extensive sampling fluctuations that are found in the correlations obtained from small, homogenous groups can be stabilized by considering the larger groups formed by combining samples across sex and location of schools within the same grade. Let us consider the correlations between the groups of variables, grade by grade.

Grade I (Male + female, Urban + rural, N = 204).

In this group, mental age and IQ have similar correlations with all the four objective variables and the Rating (total) score of the mosaic test. All the correlations are low positive or negative, with the exception with Rating total, mental age having a correlation of .203** and IQ of .184**. The next variable, 'social maturity' has mostly low positive correlations with the mosaic test variables, none of which is significantly different from zero. 'Moral relativism' has correlation of .132 with 'time taken' and .122 with 'Rating total', and near zero correlation with the remaining 3 mosaic test varinbles, 'Sociometric status index' correlates .218** with 'time taken', .134 with 'rating total', .108 with 'area covered', and near zero correlation with the remaining two mosaic test variables. Hindi achievement total correlates .212** with 'time taken', .260** with Rating total, .143* with 'number of pieces', .089 with 'area covered', and somewhat strangely, – .139* with 'number of sub-designs'. Mathematics achievement correlates .216** with 'time taken', .336* with 'rating total', .118 with 'number of pieces', .064 with 'area covered', and –.146* with 'number of sub-designs'.

Grade II (Male + female, Urban + rural, N=188).

The pattern of correlation is the same as in grade I, with one change: most of them register an increase towards the positive direction. Mental age correlates .164** with 'Rating total', and the remaining correlations are low positive and one low negative (with 'number of subdesigns'). Correlation of 'mental age' with 'time taken' is .113, and with number of pieces is .115. IQ has similar correlation with all the five mosaic test variables, the correlation between IQ and 'Total rating' being .160**. Social maturity has near zero positive or negative correlations with all mosaic test variables. The same is the case with 'moral relativism', with one exception: it correlates .168** with 'area covered'. Again, 'sociometric status index' has mostly near zero correlation, positive or negative, with all mosaic test variables. The situation is quite different with Hindi achievement (total). It correlates .293** with Rating total, .235** with 'time taken', .199** with 'number of pieces', and -.041 with 'number of subdesigns'. Mathematics achievement test correlates .229** with 'Rating total', and .130 with 'Time taken', the remaining correlations have near zero positive or negative values.

Grade V (Male + Female, Urban + Rural, N=211)

Here also, the pattern of correlations is the same as in grades I and II, with some further improvement in the positive direction, in the values of the coefficients. Now, mental age correlates .203** 'time taken' and .152** with 'Rating total'. Similarly, IQ correlates .184** with 'time taken', .176** with 'number of pieces', .192** with 'area covered', but only .053 with 'Rating Total'. Sociometric status index correlates near zero with all mosaic test variables. Hindi achievement total correlates .163** 'time taken' and .168** with 'Rating total', the other 3 correlations being low positive. Mathematics achievement also correlates .184** with 'Rating total', and .205** with 'time taken'.

A few findings can thus be considered to be consistent. 'Time taken', and 'Rating total' are the two variables from the mosaic test, which correlate positively and significantly with 'mental age', 'IQ', 'Hindi achievement', and 'mathematics achievement'. Secondly, 'number of pieces used' also tends to correlate positively with these intervening and achievement variables. 'Area covered' also tends to correlate positively with these variables. Fourthly,

'number of subdesigns' tends to have negative correlations with the intervening and achievement test variables. Higher intelligence and lesser number of subdesigns seem to go together. The uniformly significant correlations of 'Rating total' with mental age, IQ, Hindi achievement total, and mathematics achievement total, in all the three grades, are to be specially noted.

Interrelationship between Independent Variables on one hand and Intervening and Achievement Test Variables on the other

One may easily get lost among the host of intercorrelations between family background variables and school variables on one hand, and the 5 intervening variables, the achievement variables in Hindi and mathematics, and objective and subjective variables in the mosaic test. To avoid this selection of variables for purposes of comparison can be resorted to. Selection itself can be guided by taking into consideration the magnitude of correlation between variables belonging to the same category, to select only those who are the most representative of the set. By applying this principle of selection, the following variables are found to be most suitable for permitting the summarization of all findings in this part:

(1) LinSES scores for representing family background variables

(2) LinSEC scores for representing level of schooling variables

(3) IQ, social maturity, moral relativism and sociometric status index, among intervening variables

(4) Achievement in Hindi (total) and mathematics

(5) Rating total for mosaic test variables.

It will be seen that under each category, the variables chosen have more common variance shared with the variables that are left out from the test. Again, applying the principle of obtaining stability among the correlation coefficient values by taking larger groups, we can ignore the fluctuations in their values due to sampling in smaller homogenous groups. However, there is not much justification for combining rural and urban samples together, as for combining the sexes together. Let us see what the findings are, variablewise, for such fairly large groups, homogenous with respect to location, but heterogenous with respect to sex, r.

(1) LinSES scores. This is a variable which

correlates positively with all the selected intervening and performance variables, 5 out of the seven of these being significant at better than .01 level, in the entire urban sample (grades I, II, V, mal and female, together, N=301). Thus LinSES correlates .297 with IQ, .390 with moral relativism, .454 with Hindi achievement, .350 with mathematics achievement, and .270 with Rating (total) of the mosaic designs. But in the entire rural sample, the picture is quite different: now LinSES correlates -.062 with IQ, and .034 with Rating total of the mosaic test - both of which are not significantly different from zero. But its correlation with moral relativism is .173**, with Hindi achievement .225**, and with mathematics achievement is .163**, and with sociometric status index is .120**. In the urban sample, LinSES correlates only .007 with sociometric status index and .023 with social maturity. In the rural sample, LinSES correlates -.023 with social maturity.

Lastly, if we take the entire sample of the respondents of all the three grades, and both sexes, of both urban and rural schools together, (N=603), we find the following correlation values: LinSES correlates .152 with IQ, .326 with moral relativism, .389 with Hindi achievement, .304 with mathematics achievement, and .200 with mosaic test Rating total. All these coefficients are significant beyond .01 level. LinSES correlates -.024 with social maturity and .046 with sociometric status index - both being not significantly different from zero.

(2) <u>LinSEC Score</u>. The picture is somewhat similar with LinSES score, but not all the way. Thus in the urban sample, (of all grades, and both sexes taken together), LinSEC correlates .232 with IQ, .316 with moral relativism, .355 with Hindi achievement, .249 with Hindi achievement, and .093 with Rating total of mosaic design. All correlations save the last one are significant beyond .01 level. LinSEC correlates -.089 with social maturity and -.022 with sociometric status index - both coefficients not being significantly different from zero.

In the entire rural sample, LinSEC correlates .028 with IQ, -.177** with social maturity, .107 with moral relativism, .025 with sociometric index, .049 with Hindi achievement, .023 with mathematics achievement, and .118* with Rating total of the mosaic test. Thus, the influence exercised by schooling, on the intervening as well as the achievement variables seems to be very low. But, schooling seems to

exercise sufficient influence on the mosaic performance, so that the correlation between LinSEC and Ratings of the mosaic reach significance at .05 level.

If the entire sample is taken into consideration, the correlations stabilize still further. Now, LinSEC correlates .086* with IQ, -.190** with social maturity, .250** with moral relativism, .006 with sociometric status index, .263** with Hindi achievement, .204** with mathematics achievement, and .131** with Rating total of the mosaic designs. One of these correlations, with social maturity, is negative and statistically significant; and the correlation with sociometric status index reduces to zero.

It is thus clear that LinSES and LinSEC variables act somewhat similarly upon intervening variables and performance variables - but the magnitude of influence of LinSES is slightly, but definitely greater on these variables, than that of LinSEC: in other words, the home influences are stronger than the school influences, both upon personality variables as well as upon performance in school subjects and a cognitive task like that of the mosaic test.

In the remaining sections of the Report, certain statistical analysis dealing with the significance of the means of scores in different variables among different groups, and the method of predicting performance in the school subjects and the mosaic test, have been described in detail. These are fairly technical, and are therefore not being summarized here.

REFERENCES

Aberle, D.A., and Naegel, K.D. Middle Class Fathers and occupational roles and attitude of children. Amer. J. Orthopsychiatry, 1952, 22, 366-378.

Ansbacher, H. Perception of number as affected by monetary value of the objects. Arch. Psychol., 1937, No.215.

Baldwin Alfred L. Themes of Child Development. New York: Wiley, 1967.

Blackwell, A.M. A Comparative investigation into the factors involved in mathematical ability of boys and girls. Brit. J. educ. Psychol., 1940, 10, 143-153, 212-222.

Bonney, M.E. A study of the relation of intelligence, family size, and sex differences with mutual friendship in the primary grades. Child Development, 1942, 13, 79-100

Bonney, M.E. Sex differences in social success and personality traits. Child Development: 1944, 15, 63-79.

Bonney, M.E. A study of constancy of sociometric ranks among college students over a two year period. Sociometry, 1955, 18, 531-542.

Bonney, Merl E., and Northway, Mary L. Childhood and early adolescent, high school and college level. In Moreno, J.L. et. al (Eds.). The sociometry Reader, Glencoe: Free Press, 1960, 401-405.

Bassard, J.H.S. The sociology of Child Development. New York: Harper, 1948, 1954.

Bruner, J.S., and Goodman, J.C. Value and need as organizing factor in perception. Journal abnorm. soc. Psychol., 1947, 42, p.33.

Burks, B.S. The relative influence of nature and nurture upon mental development. Washington: National society for studies in Education, Twenty-seventh year book, Part I, 1928.

Burt, C.L. Mental and scholastic tests. London: King, 1921

Butler, E.I. A study of the needs of high school students and the effectiveness of a program of learning in selected phases of child development and family relationships. Univ. of Iowa Studies in Child Welfare, 1934, 10, 169-248.

Campbell, E.H. Differences in clique formation among adolescent boys and girls revealed by "guess who" technique (Abstract). Psychol. Bull., 1939, 36, 537.

Challman, R.C. Factors influencing friendship among preschool children. Child Develpm., 1937, 3, 146-158.

Chatterjee, Bishwa B. Basic education and creativity: Interdiscipline, 1971, 8(2), Summer, 16-25.

Chatterjee, Bishwa B. Some recent studies with Lowenfeld Mosaic Test. In Friedman, A., H. Philipson, Beatrice Scott and Celia Williams (Eds.) Rorschach Proceedings. Berne: Hans Weber 1970, 849-860.

Conklin, K.M. Failure of highly intelligent pupils. Teachers College Contributions to Education No.792. 1940.

Emmett, W.G. Evidence of a space factor at 11 and earlier. Brit. J. Psychol., Stat. Sect., 1949, 2, 3-16.

Feinberg, M.R. Relation of background experience to social acceptance. J. abnorm. social Psychol., 1953, 48, 206-211.

Fleming, Charlotte M. Class size as a variable in the teaching situation. Educational Research, 1959, 1, 35-48.

Flowtow, Ernst. A. Changing social relationships of school children. Elementary School Journal,

Freeman, F.N., Holizinger, K.J. and Mitchell, B.C. The influence of environment on the intelligence, school achievement and conduct of foster children. Washington: National society for studies in Education, Twenty seventh year book, 1928.

Gessell, Arnold. Studies in Child Development. New York: Harper, 1948.

Gessell, Arnold. The Ontogenesis of Infant Behavior. Chapter 6, in Carmichael, Leonard (Ed.). Manual of Child Psychology. New York: Wiley, 1954, 2nd Edition. 335-373.

Ginsburg, Herbert, and Opper, Sylvia. Piaget's Theory of Intellectual Development - An Introduction. Englewood Cliffs: Prentice-Hall, 1969.

Grossman, B., and Wrighter, J. The relationship between selection - rejection and intelligence, social status, and personality among sixth grade children. Sociometry, 1948, 346-355.

Haggard, E.A. Socialization, Personality, and Achievement in gifted children. School Review, 1957, 65, 318-414.

Havighurst, R.J. Social Class and basic personality structure. Social Research, 1952, 36, 355-363.

Heber, R.F. The relation of intelligence and physical maturity to social status of children, J. educ. Psychol., 1956, 27, 197-216

Hobson, J.R. Sex differences in primary mental abilities. J. educ. Res., 1947, 41, 126-132.

Hunt, Joe McVicker. Intelligence and Experience. New York: Ronald Press, 1963.

Johnson, Orval G., and Bommarito, James W. Tests and Measurements in child Development: A Handbook. San Francisco: Jossey-Bass, 1971.

Kimball, B. Case Studies in educational failure during adolescence. Amer. J. Orthopsychist, 1953, 23, 406-415.

Klineberg, Otto. Race Differences. New York; Harper, 1935.

Klineberg, Otto. Negro Intelligence and Selective Migration. New York: Columbia University Press, 1935.

Klineberg, Otto. Social Psychology. New York, Holt, 1940.

Kuhlen, Raymond G. and Bretsch, Howard S. Sociometric Status and personal problem of adolescents In Moreno, J.J. et al. Sociometry Reader, Glencoe: Free Press, 1960, 406-416.

McIntyre, G.A., and Wood, W. The standardization of an Australian reading test. Aust. Counc. Educ. Res., Series No.39, 1935.

McNemar, Q., and Terman, L.M. Sex differences in variational tendency. Genet. Psychol. Monogr. 1936, 18, 1-65.

Masklund, S. Scholastic attainments as related to size and homogeneity of classes. Educational Research, 1963, 5, 63-67.

Mishra, T.P. An investigation into the attitudes of male teachers of schools of Lucknow towards their teaching profession. M.Ed. Dissertation, Lucknow University, 1957 (Referred to in NCERT Year Book, 1968).

[illegible], B.S. Causes of failure of students in English at the High School Classes Examinations. M.E. Dissertation, Utkal Univ. 1959. (Referred to in NCERT Year Book - 1968).

N.C.E.R.T. Child Development: A Symposium. New Delhi: N.C.E.R.T., 1964.

Newman, H.H., Freeman, F.N., and Holzinger, K.J. Twins: A Study of Heredity and Environment. Chicago: University of Chicago Press, 1937.

Newman, H.H. Multiple Human Births. New York: Doubleday, Doven, 1940.

Pandey, O. A Study of Women teachers-trainees' attitude towards their profession. M.Ed. Dissertation, Allahabad Univ. 1958 (Referred to in NCERT Year Book, 1968).

Peters, C.C. and Van Voorhis, W.R. Statistical Procedures and their Mathematical Bases. New York: McGraw-Hill, 1940.

Piaget, Jean. Moral Judgment of the Child. London: Kegal, Paul, 1932.

Powell, T.J. Experimentation in teaching in high school education. Educational Research, 1964, 6, 179-191.

Rao, S. Narayana. Problems of adjustment and academic achievement. J. educ. vocat. guidance, 1959, 5(4), 167-171.

Rao, Narayan S. A study of the sense of responsibility and its relation to academic achievement. Psychological Studies, 1964, 10(2), 108-118.

Saran, P.M. A Critical investigation of the reasons of high percentage of failures in High School Class in English. M. Ed. Disstt., Sangam, 1962 (cited in NCERT Year Book, 1968).

Schiller, B. Verbal, numerical, and spatial abilities of young children. Arch. Psychol., N.Y. 1934, No. 161.

Sears, R.R., Maccoby, E.E., and Levin, H. Patterns of Child Rearing. Evanston: Row, Peterson, 1957.

Sharma, Atmanand. Handbook on Sociometry for Teachers and Counsellers. New Delhi: Department of Educational Psychology and Foundation of Education, N.C.E.R.T., 1970, (memiographed).

Sharma, S.N., and Chatterjee, B.B. Analysis of output of three projective tests: The Mosaic, The Toy World, and The MAPS. J. Ind. Acad. Appl. Psychology, 1967, 4(3), 63-76.

Sharma, S.N. and Chatterjee, B.B. Behavioral analysis of three projective tests: The Mosaic, The Toy World, and The MAPS. J. Ind. Acad. Appl. Psychol., 1967, 4(1), 21-26.

Smith, H.L., and Eaton, M.T. Analysis of the Proficiency in silent reading of 15206 sixth grade pupils in 648 schools in Indiana. Bulletin of school Education, Indiana University, 1945, 21, No.6.

Smith, H.T.A. Study in the selective character of secondary education's participation in schools as conditioned by socio-economic status and other factors. J. educ. Psychol., 1945, 36.

Smith, I.M. Measuring spatial ability in school pupils. Occup. Psychol., London, 1948, 22, 150-159.

Sprott, J. J.H. Social Psychology, London, Methuen, 1966. (original edition published in 1952).

Statt, M. Research in family life in Nebraska. J. Home Economics, 1954, 37, 30-83.

Stephano, J.M., and Lichtenskein, A. Factors associated with success in teaching grade-five arithmetic. J. educ. Research, 1947, 40, 683-694.

Stern, W. Uber Psychologie der individuellen Differenzen. Leipzig., Barth, 1900.

Terman, Lewis M. and Typer, Luna F. Psychological sex Differences. Chapter 17, in Carmichael, Leonard (Ed.). Manual of Child Psychology. New York: Wiley, 1944. 2nd Edition, 1064-1114.

Thorndike, E.L. et. al. Prediction of Vocational success. New York: Commonwealth Fund, 1934.

Tiwari, R.L. An investigation into the factors responsible for the future pre-University students. M.Ed. Dissertt., Rajasthan University, 1962 (cited in NCERT Year Book, 1968).

Tyler, Leona F. The Psychology of Human Differences, New York: Appleton-Century-Confds. 1956. Second Edition.

Walsh, A.M. Self-concepts of bright boys with learning difficulties. New York: Bureau of Publications, Teachers College, Columbia University, 1956.

[illegible], B. The school child's choice of companions. J. educ. Res., 1926, 14, 126-132.

[illegible], J.R.K. Difficulties in achievement attributed to different educational environments. J. educ. Research, 1958, 52, 82-93.

Woody, C. The arithmetical backgrounds of young children. J. educ. Res., 1931, 34, 188-201.

APPENDIX

List of Schools included in the Sample

ID No. of School	Name of School
01	Besant Theosophical School, Kamachha
02	Bal Niketan, Maqbool Alam Road
03	Government Girls Inter College, Ramkatora Road
04	Government Normal School, Mahmoorganj
05	Basic Primary School, Dashashwamedh
06	Basic Primary School, Katuapura
07	Basic Primary School, Pakka Bazar
08	Basic Balika Primary School, Ausanganj
09	Sarswati Uchchatar Madhyamik Vidyalaya, Suriya
10	Basic Primary School, Maldahiya
11	Basic Balika Primary School, Khojwa
12	Basic Primary School, Pitarkunda
13	Basic Primary School, Konia Satti
14	St. John's High School, D.L.W., Manduadih
15	Basic Balika Primary School, Bhadaini
16	Basic Balika Primary School, Chakia
17	Radha Kishori Government Girls Intermediate College, Ram Nagar
18	Basic Primary School, Shikarganj
19	Aniwarya Primary School, Baragaon
20	Maha Bodhi Basic Primary School, Sarnath
21	Basic Balika Primary School, ~~Ghosila~~
22	Basic Primary School, Ghosila
23.	Basic Primary School, Naugarh
24	Basic Primary School, Vishunpura
25.	Basic Primary School, Diggi
26	Basic Primary School, Barahni
27	Basic Primary School, Deraval
28	Basic Primary School, Kamauli
29	Basic Primary School, Gyanpur
30	Basic Primary School, Kundi
31	Basic Primary School, Durgaganj

N.B. Nos. 01 to 15 are urban schools.
Nos. 16 to 31 are rural schools.